ABSTRACT

The concept of intellectual capital was introduced in the year 1969 and was coined by economist named John Kenneth Galbrais. The other view on intellectual capital was stated by Drucker(1992) as the only major source of capital that can create productivity and contribute towards profits for corporations(Chang & Chen, 2012). The problem statement refers to lack of recognition about this significant contribution of intellectual capital towards corporate financial performance. Intellectual capital can be defined as the 'economic value' of three categories of intangible assets of a company-that includes human capital, structural capital and capital employed collectively. It is the knowledge that is to be leveraged and utilized by an organization to help conduct its business in order to achieve its long-term competitiveness(Ming-Chin et al., 2005).

The purpose of this research is to empirically test the influence of intellectual capital on corporate Financial performance within the Automobile sector companies in India. The sample selected are fifteen companies listed by the nifty auto index. The data is through yearly reports gone public by the company and the period of study is 10 years ranging from the year 2008 to the year 2018. The financial data and information required for the study were drawn from the secondary source. The estimation technique used for the analysis is panel descriptive analysis using the Ordinary Least Square (OLS) estimation technique to assess the effect of Value-Added Intellectual Capital (VAIC) on financial performance. To do this, the pooled OLS, Fixed effect OLS and the Random effect is analyzed.

The dependent variable financial performance with reference to the study is measured by ratios such as profitability, Activity, Capital return and Value creation using Return on Investment Return on Assets, Return on Equity, Enterprise value, Asset Turnover, Price to Earnings ratio and Market to Book Value ratios. For the independent variable along with firm size and financial leverage, "Value added" is employed as indicator which measures Intellectual Capital. This method was initiated by Pulic (1998). He defined it as "how much and how efficiently Intellectual Capital (IC) and capital employed create value to a firm". He categorized Intellectual Capital into three main components: Structural capital, Human capital and Capital employed capital. The study employs seven regression models to examine the influence of Intellectual capital on the financial performance of the Automobile companies. The overall results indicate that intellectual capital has positive and strategically significant influence on the financial performance of the companies which are represented by ratios such as Return on Assets, Return on Equity, Return on Investment and Market to Book Value. However, the variables Asset turnover, Enterprise Value and price to Earnings showed a negative influence indicating that factoring in intellectual capital requirements into productivity decisions are not viable. The negative effect on price to Earnings and Enterprise Value has further scope of research leading to another research problem. It is expected that the results of this research will enhance knowledge and recognition of intellectual capital value as a contributor towards corporate financial performance, thereby enhancing the value of the firms representing the automobile sector in India.

Keywords:
Intellectual capital, Value added Intellectual Co-efficient, Components of IC, Financial Performance and Value of the firm.

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INTRODUCTION

Researchers have introduced the term knowledge led economy by the late 1990's. It was explained as a scheme which exhibits a new dynamic of society and the evolution of an economic paradigm that results in a very impressive change in the corporate world around the corner of the 20th century. The reason for these changes were the tremendous growth in the idea of knowledge and the distribution of the same. The spurt of innovative technology greatly affected the previous precarious and incessant matrixes of innovating into a new associative, powerful matrix of innovation processes, which help fast and comprehensive production of new knowledge and enhancement of the existing one, where innovators were provided easier access to knowledge of their predecessors (Law & Kilicman, 2018).

The challenge faced by business in today's growing investment practices is to convince the stockholder that they have made the right investment. But both from the investor's perspective and the corporate perspective there is no right model that exactly reveals the financial performance to ensure the return on every investment made. Research in the field has been performed in multiple levels but there is no technique that clearly acts as an indicator to evaluate the performance of a business. The problem has been to some extent mitigated by value added concepts that has been evolved in the late 19th century.

The gap between the Market value of an enterprise and the book value of the same is unanswered and not very clear. The wider the gap the larger the confusion with respect to the intrinsic value of a share and the decision to be made based on its true value. The rising gap between the book value and the market value of a firm which is because intellectual capital information is not apprehended in financial statements(Edvinsson, 1997) Valuation models have failed to consider the importance of the presence of intangibles in business. Intangibles are often interchanged with intellectual capital of a business, but the intangibles reflect only those investments which are accounted in the books of account such as patents, license etc., but the intellectual capital of a company is appreciable assets and they remain as indicators of growth.

Financial Performance

Performance in general refers to the attainment of a mission and the realization of its outcome against preset standards. It refers to the level at which a task has been

attained. When some enterprise states performance it literally means its success, whereas if it refers to the specific term financial it means the overall success in terms of its profitability and general well-being. It normally refers to all the action connected to fulfilling financial objectives. It reflects to the firm's activities measured in monetary terms. It also indicates the financial tenability of a firm over a time frame and it serves as a barometer for comparison either across similar industry or across sectors.

Financial Performance and Intellectual Capital

Firms normally focused on increasing their value by focusing on the financial performance. The aim of a growing business development firm is to augment the value of shareholders. All the activities of the firm ensure that they yield a positive return to the stake holders. Research has identified numerous value based financial performance measures. These value-based measures strive to remove the accounting distortions that are normally existing in any of the traditional measures of analyzing firms. (Erasmus, 2008). The theory of intellectual and capital has evolved from the medieval era in different forms, the concept became popular during the early nineteenth century and it application became significant after the debut of the Balanced Score Card. In the last two decades there were significant number of researchers, practitioners and academicians who discussed the signification of intellectual capital which created a drive towards an expertise-based economy. It has become the integral part defining the capability of an organization. It is used as an indicator to enhance and maximize the value of a firm in terms of its performance. Despite tough competition faced by firms in today's business context knowledge acts as a driving force to achieve the desired targeted results.

"Difference between a firm's market value and the cost of replacing its assets, it is those things that we normally cannot put a price tag on, such as expertise, knowledge and a firm's organizational learning ability. Market value equals book value plus intellectual capital, with book value usually only the tip of the iceberg of wealth"(Kamukama et al., 2010). The research community in general states that intellectual capital is "knowledge that is of value to an organization. Its main elements are human capital, structural capital, and customer capital. Intellectual capital encompasses much more than patents, copyrights and other forms of intellectual property. It is the sum and synergy of a company's knowledge, experience, relationships, processes, discoveries, innovations, market presence and community influence".

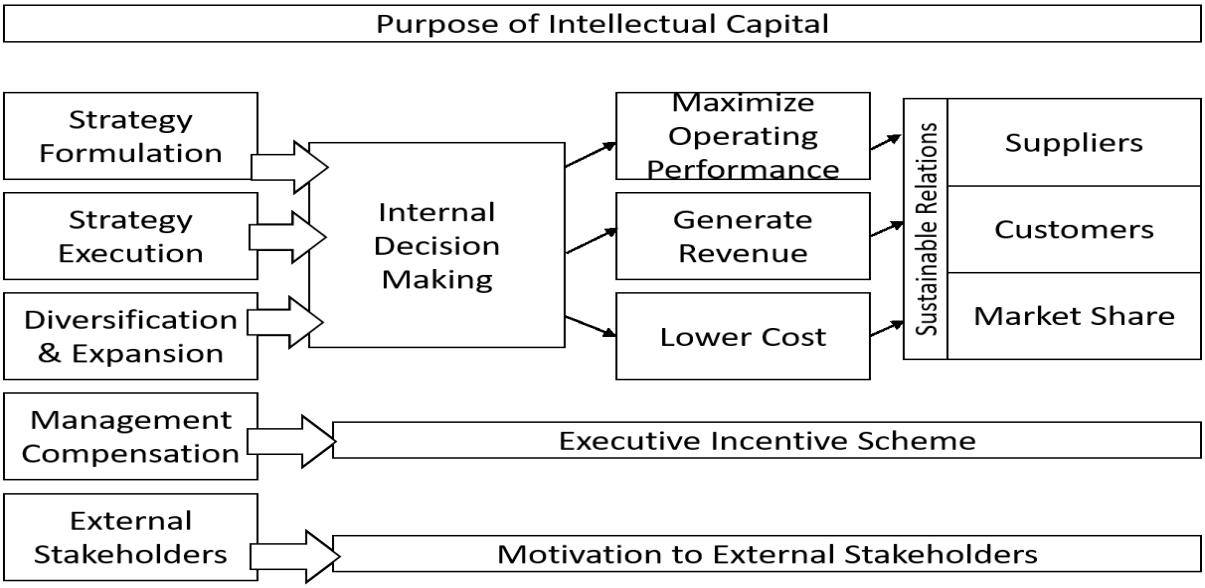
Indian Automobile Industry

Intellectual capital has been distinguished as an important metric in most of the prominent sectors such as technology companies, pharmaceuticals, banks and financial institutions. However, very minimal studies have identified intellectual capital of the industry related to automobile. The first intellectual capital reporting in India happened in the year 1997 by Reliance Industries ltd, followed by 2 other companies, while the European and other western countries have already published their intellectual capital reporting in a structured format. The Indian reports had only a narrative style where the details were given in general and no specific details about the components were mentioned. Components were made very specific by disclosures made by other countries who have initiated the process long back(Pablos, 2005).

The challenges impacting the Indian automotive industry are the improvement of roads and laws for traffic regulation and enforcement. The impact of traffic congestion should be reduced. Moreover, increase in port capacity for the export of vehicles should be improved(Kumar, 2018). A report generated in February 2017 states that India is known as the fastest growing market for cars. The Indian automobile industry categorized into commuter cars, high economic vehicles, light economic vehicles, medium commercial vehicles, multidimension vehicles such as tractors jeeps, three-wheel vehicles and two-wheel vehicles.

Purpose of intellectual capital

A review of literature gives the following possibility of a study on Intellectual Capital. Various literature studies have revealed that organizations need to analyze their intellectual capital. It is very vital as it helps to formulate their strategy and to evaluate the formulated strategy. Firms focusing on expansion have to focus more on their intellectual assets as they produce and promote value. (Miami, Varmaghani, & Meihami, 2013) refers to the estate of capital which is intellectual as “it is not universal and the evolution of intellectual capital is not a common industry phenomenon. It is therefore important for researchers to develop an industry specific measurement tool.” Even the firms diversifying their business have to understand the intensity of the knowledge capital that exists in the form of intangibles. Managers get compensated with incentives not merely by showing the book value but by increasing the general gap amidst the value in the books of account and the value in the market price of the firm. Most often external stake holders understand the firm better and are confident in investing in firm that has its investments at a higher level in intellectual assets.



Source: Framed from literature review

Figure 1. Purpose of Intellectual Capital

The above process flow clearly represents the purpose of intellectual capital, the reason behind firms to inculcate the habit of measuring and managing intellectual capital. It helps in strategy formulation to execution and in the firms plan for diversification and expansion which occur in the process of internal decision making which in turn helps to maximize their operating performance, generate revenue and lower the cost of operations. This leads to sustainability in the firm's relationship with suppliers, customers and increase their market share. The important decision in terms of management compensation helps in deciding the incentive schemes allotted for management compensation. Most important, the intellectual capital of a firm helps the external stakeholders and it serves as a motivation for them. Thus, the above process flow helps in understanding the purpose of intellectual capital. Several studies have proved that intellectual capital serves to be useful for corporate internal governance and for communicating the performance of a firm to the external stakeholders.

Human capital

Human investment capital is the expertise of employees, understanding base of the firm, Attitude and culture of the workforce. Intellectual capital states that the quotient could be increased by the increasing the ability of the employees. Human investment capital normally relates to the expertise of capabilities and wisdom of each and every personnel of the firm who are employed to give solutions to customers queries. It serves to be the strength of the organization; it refers to the firm's aggregate

capacity to bring out the first possible answers from the intellect of its employees. This brings in innovation and calculated rekindling of every effort put in for the growth of the firm. This includes routine work and also work related to growth either through research or just participating in team events.

A literature survey conducted on the Human invested capital aspects revealed that intellectual capital is appreciated capital and it is purely involved with the capability and dedication of the team of employees. However, there is a significant delay in identifying the usefulness of this intangible. Engagement of employees, lack of voluntary association, those who are voluntarily associated with an organization have an emotional bond towards a firm. The managers most often do overlook the value of human capital due to increasing load and pressure in work and increased competition and thereby fail to introduce the human capital efficiency indicators in today's modern management practice. The most important issue is that investment in intellectual capital is not focused. Investments are diverted to other productive work rather than investment in embedded technology that servers the work force.

Structural capital

Structural capital refers to a varied range of systems and procedures that exist in a firm which includes patents of products, concepts of work, models or framework and computer or system and the structure and administrative complex process and procedures. Most of the decisions concerning structural capital are internal and it refers to in-house dealing. They are termed to be either the spirit of the organization or the culture or may be the interactions but all together forms a structure and it refers to the sability existing in an organization and it is also commonly referred as the organization's capacity. It also involves the patterns that swirl around the routine that act as a support system to the employees to enable their optimum performance. An employee which forms a basis of human capital component could be of high intellect but he could fail miserably if the firm does not have adequate support system and procedures to protect its intellect (Mondal, 2016).

When considering structural capital, it accompanies with innovation capital which refers to the capacity to innovate for the firm and develop new products and design service process. The service capital of a firm normally speaks about the processes involved, the techniques involved the usage process of systems and the tools used as models by a firm. It involves the strategies, network techniques, database storage, file management and also the entitlement to the software's, process, copyright,

invention and trademark. It also covers the brand building exercise, the licenses obtained. It basically involves all the internal activities and initiatives of a firm.

The structural capital of a firm generally revolves around its systems, structure, strategy and culture; however, it also includes the firm's values, philosophy, formal and informal process, it's branding, the method of information and data collection and processing, the codified system knowledge, patents & copyrights and most important is the trade secret of the business. Structural capital defines the perception of the stakeholders about the business and thus shapes the decision making. Strategies formulated by the top management generally pass to the lower levels in a direct and efficient manager only if the culture and the structure of the organization supports it. Structural capital enhances structural organization for effective strategy formulation and execution. These unknown intangibles which do not come into the mainframe of a business cannot be managed unless a proper system and procedure is in place to measure them. It is important for any organization to look beyond the boundaries to establish relationships with trust and confidence and build a better surrounding.

LITERATURE REVIEW

The topic researched required the support of extensive literature survey about the concept. The direction of the study indicated that financial performance serves as an indicator of majority of the corporates. The study of literature also helped in understanding that most of the research conducted in this topic has been quantitative data analysis. Automobile industry and its financial performance which were widely influenced by the intellectual capital of each of the firms under the industry is the main focus of the research. The study was done using published financial data.

The literature review began by exploring literature on value based financial performance measures. It includes historical data on developments related to value-based performance measures. Extensive reading and review on articles from journals, research publication and books on topics related to value and value performance was done. The review further extended to specific interest on the topic of research which revolved around intellectual capital and market value. Further leading to the various models, business valuation and factors influencing intellectual capital research. The measurement aspect included the financial aspect of a business and study related to concepts, models and methodology were studied. Literature surveyed: Journals, Articles, Research archives and documents.

A search in details had been conducted to find the most relevant data. Information on the core topic and related concepts have been done. Keywords most prominently used in the beginning of the search was on value-based literature and financial performance, later the search keywords extended to economic value added and finally to the following keywords – which includes the human capital, the structural capital, most of customer capital, analyzing relational capital, finding innovation capital, the impact of the value addition in capital, value added intellectual capital, value added intellectual capital which are stated as efficiency indicators and finally to measurement and knowledge management. The search on keywords like intellectual capital models like the direct intellectual capital, return on assets, market value, return on equity, market to book value, asset turnover, market capitalization, Tobin and various other financial performance indicators were researched.

Inquiry of Intellectual Capital & Intangible assets

The most significant challenge for the researcher in identifying an index which truly reflects the value of a company has led to the review of extensive literature related to business and its models and the extensive usage of the word intangible as a resource and the way in which the intangibles are not accounted as asset. The value of intangible is increasingly gaining weightage but again the same has an issue which complicates the firm to analyze the kind of intangible that continuously need to be supervised using efficient and effective indicators to achieve the results. (Shital Jhunjhunwala, 2014). Intangibles generally refer to three critical attributes, the first one is that it should be identifiable, the second is the company should have control over them and the third and the most significant one is that intangibles should have expected future economic benefits. (International Accounting Standards Board, 1998).

Most of the research revolves around the importance of intangibles in today's modern business economy and some of them specifically point out to the fact that entities that focus on knowledge as a strategic resource are more successful than the ones that ignore it. The concept has an augment efficiency level and they claim to have a competitive advantage over the other concepts. The study concludes that the status of quality of investment in intangibles have a reasonably direct impact on the performance aggregation of an entity(Vreja, n.d.).An evidence revealed in the paper submitted by (Ittner, 2008)states that there are difficulties in assessing whether or when internal measurement of intangible assets improve performance. Though majority of the studies have proved or has some evidence that measurement and management of intangibles

has a direct influence on performance. Most of the study has limitations in terms of intangibles by perception or the resultant variables. Some of them had difficulty dealing with control variables and contingency factors. Most of the researches had stated the fact of inadequate data on implementation practice of firms (Ittner, 2008).

A study on the intangible asset's valuation in the Malaysian capital market reveals three opinions. The study shifted its focus from financial statements for stock valuation. Second the study focused on factors around firms that reveal that intangible assets are dynamically important and capability in qualifying as strategic assets which are completely or totally ignored and not effectively managed. Finally the study concluded that corporates that focus more on intangibles show better financial performance(Salamudin et al., 2010). Most of the studies revolving around intangibles shows that intangibles are knowledge assets which depicts the customs and practices firms adopt to achieve their goals. Today's concept is that intangibles have become an important element overtime and has inextricably embedded in improved tangible assets. The study proves that revenue generated by firms having more of intangibles provide useful inputs to value their firms(Basu & Waymire, 2008).

The study on various intangibles and the study on knowledge management and knowledge management process adequately proves that intangibles and knowledge management is vital for firm performance and development. As suggested by most of the authors intangible and knowledge management by itself does not solve the problem of firm valuation or to bridge the gap between market price and book value. The concept of intellectual capital has evolved from intangibles. Intellectual capital is an intangible asset that is hidden. It deals with many process including building brand image, advancement in technology, loyalty of customers, the culture of the organization and its competencies(*Itami, H., & Roehl, T. W. (1991).*

The idea of intellectual capital is slowly taking a paradigm shift in concept as the author introduces a new term for it called as business model innovation. This involves process and products not forgetting technology. It becomes the fundamental element for value creation and this plays a major part in technological spin-offs. The study contributes towards investigating as to how business model innovation can benefit business by leveraging intellectual capital to a large extent (Elia et al., 2017). A study by a scholar has rightly stated in his conclusive remarks that "The value of intellectual capital in an organization or in the economy as a managed asset has many different specific perspectives. The development of those perspectives is in part due to the utility

of the concepts included in intellectual capital valuation: human capital, structural capital, knowledge capital, customer capital, intellectual assets, and intellectual property" (Shane D. Shook,2002).

Determinants of intellectual capital

There are several studies which initially tried to aggressively identify the determinants of intellectual capital and also to find out if companies are willing to voluntarily disclose intellectual capital and if there are some key drivers that induce the companies to disclose their intellectual capital. A review of the available literature clearly indicates that there are several factors which have been tested to find out and confirm that they have influenced intellectual capital communications. Some of the factors which are identified in common by most of the researchers are related to the size of the firm, the type of industry, their information asymmetry, the ownership pattern, the firm leverage, the age of the company, its profitability, its nationality, the listing status, the auditor type, the firms foreign activity etc. The study normally considered the effect of variables such as industry classification of its industry, their size and profitability(Morariu, n.d.). The results of a study proved that company size, industry type and market capitalization are significantly associated with the intellectual capital disclosures, while the influence of company profitability on the level of intellectual capital disclosures is not significant.

Employee motivation was identified as the very critical factor in adding value and thereby focus on reliable and loyal client by devising ideas and creating an environment which is positive and flexible. (Mačerinskienė & Survilaitė, 2012). The study analyses various theories of Corporate Social Responsibility and green management. It incorporate the fundamental theories of green management to identify an even essential abstract model of this green intellectual capital and to explore its managerial inferences to identify its determinants(Chang & Chen, 2012). Firms that spend on maintaining relationships and identify innovation are able to generally capture additional information of the structure capital of a firm and it has an effect which is positive on the additivity value of the firm. These firms generally work on the book to market value ratio. But they however do not support the concept that higher book to market value means higher innovation(Tripathy et al., 2014). An interesting investigation into production function of a firm based on the use of the concept finds that if there is a new business model then it needs new firm theory. This initiates a vision

in intellectual resound and their interrelation which augments value(Shakina & Barajas, 2014).

Methods of measuring intellectual

Most of the research has divided these methods under four categories. There are various methods evolved from the period 1980 to identify valuation methods that evaluate a firm's performance. Initially the valuation methods were called as evaluation of firm performance and later it was categorized into quantitative and qualitative valuation methods. Quantitative valuation refers to monetary methods which generally refers to the financial statements while the non-monetary methods were subjective valuation methods. A study was able to assess more than 60 valuation methods. The results of the study show that the methods that are used for evaluation are categorized under four categories.

The first method is under the general principle of valuation which categories under the valuation principle where the following variables were significantly categorized under one method of valuation which is termed as general categorization the variables such as the return on the assets, the direct intellectual capital, book and market capitalization method and direct scorecard method comes under this method. The second method is under the objective valuation method where the methods which does not fit into any of the valuation methods are categorized under this method. The third method brings in the quantitative method in the process of measurement those it is under the quantitative method of evaluation, variables which are qualitative also could be assessed and converted into quantitative terms. The final classification comes under the term the kind of expression the results of these valuation methods brings in they include financial valuation, measurement system of values, their assessment and the various methods of measurement are listed and identified. Using the appropriate method depends upon the type of the study and the question that has to be researched. The research gap in various studies proves that though the volume of studies is numerous (Ramanauskaitė & Rudžionienė, 2013).

The second and the most common method which is commonly referred by researcher is the market Capitalization - Method which is mostly the difference between the firm's market capitalization which is generally the market price which is multiplied by the share number owned by the company. and the book value of a firm's total assets. The market capitalization method evaluates the following authors methods. Methods

such as Tobin Q, The Investor Assigned Market value method, most of the Market-to-book value method etc., The third method caters to the Return fetched on Assets Method where most of the secondary data analyzed using this method. Here the earnings of a company are analyzed. Under this method Economic Value Added which was developed by Stewart (1997) is widely accepted and acknowledged by most firms. Economic value added argues under the phenomena that net operating profit of a firm does not account for the real value of a firm as it incorporates measures taken by means of debt as interest is accounted as an expense but whereas the capital sourced in terms of equity and the cost of equity is not calculated or used for evaluation of the earnings of a company.

Human resource costing introduced by many authors stresses the fact that the human resource cost has to be capitalized rather than being accounted as an expenditure. Some other studies show that the proportion of intangibles disclosed by a firm depend upon the return derived by that portion of intangible asset in an organization. An accounting method introduced under the return on asset method is the accounting for the future method, whereas the gap amidst the discounted cash flows at the beginning and the gap at the end of the period reveals the true value of a firm. The most common method mostly adopted by majority of the researchers is the Value to be added intellectual capital method (pulic, 1997).

Another method researched and identified and which is commonly used is the Scorecard Method. In this method the reports are in the form of graphs or scores. Here this method is very simple but only that the value of intangibles has not been estimated in the process appropriately(Moon & Kym, 2009). Though a brief about the different models analyzed by different authors are given at various time period. One study which gives a summary of all the intellectual capital initiatives undertaken from the period IC was incorporated in business is very interesting and the study also states chronological facts. The next stage is to calculate the efficiency of the various human capital employed. The human capital employed efficiency is the ratio of value added and human capital. This gives information on how much value added is created as a result of investing one unit on the human resource investment. The next stage is to calculate the efficiency of the various structural capital employed. It is the calculated difference in value between the amount of value added and its human capital. Its efficiency is calculated as the ratio of structural capital and value added. This ratio indicates the percentage of the structural capital share in the total percentage of value added.

The final step is to calculate VAIC which is the total of all the efficiency indicators such as capital employed efficiency (CEE), Human capital efficiency (HCE) and its structural capital efficiency (SCE). Most of the research is based on this model of evaluation as this index is very simple to calculate, the data is acquired through the secondary data available in the form of reliable annual reports. It also clearly bifurcates the tangible and intangible assets of an organization. Moreover, by calculating the index over a longer period of time we will be able to observe changes in the assets and their efficiency. It helps in identifying barriers to the growth of any company".

A study conducted in the commercial banking sector of Malawi which used (VAICTM)model to analyze the influence of IC and it proved that if more effort is put in improving the IC efficiency the results on performance will be positive. It also stressed on the fact that compared to the other efficiency indicators human capital efficiency does have a significant role on the value of the business (Lipunga, 2014). The research tries to establish something between firms Intellectual Capital and its financial performance. It also discussed market place and its economics. The research was based out of twenty and five listed companies in Tunisia. Panel data was used to identify results, the study shows positive relationship and the exact impact was analyzed (Zehri et al., 1839). Another study which had performed a detailed analysis of the methods had concluded that value added method has the means to identify and measure the individual components efficiency(Svanadze & Kowalewska, 2015). The findings of a study conducted through an analysis by studying the weakness of all the methods of measuring intellectual capital, the author has concluded that except for value added intellectual capital method all other methods have several weakness (Mohamed, 2017).

Intellectual capital – Financial performance

Most of the literature in terms of the relationship amidst the performance of a firm vs intellectual capital denotes that there is an affirmative relationship. The study recommends to middle and top managers, stakeholders and shareholders, foreign and local investors and others to focus more on the firm resource especially that is internal to the company and capabilities to a firm. The study identifies that intellectual capital model helps firms to obtain higher financial return and increase credibility of a firm (Afshari et al., 2014). Though most of the study indicates that the three elements like human investment, structural investment, and relational capital investment was majorly used by researchers, it identified technological capital and the results indicates that firms attaching more focus on technological capital along with the other components

improves firm performance(Alazzawi et al., 2018). Another study which aims to analyses the dependence of intellectual capital and financial performance of biotechnological (biotech) companies representing the pharmacy industry. The results indicate negative relationship between the Return on invested assets, return on sourced equity and value market to book value, which contradicts most often the literature (Anghel et al., 2018). Analyzing the influence on intellectual capital on direct stock return indicates that IC does not directly influence direct stock return but it does have a positive association with the growth in stock return. The results also show that any relation change in the stock return are influenced by some factors that are external to the firm such as inflation and other economic conditions(Djamil et al., 2013).

Research methods and Intellectual Capital

The literature suggest that what role of intellectual capital played in business uses financial data and in most cases businesses use the value added intellectual capital model (Andreeva & Garanina, 2017). Content analysis is used to codify both qualitative and quantitative information (Guthrie & Abeysekera, 2006) The research approach states that all observations that are made through qualitative summaries are converted in to quantitative statistics and later classified into parts of the text where the focus is on implications of the collected data. The same has been followed by many researchers in annual report review (Gray, et al., 1995; Guthrie et al., 2004).

A VAIC index helps in ranking firms on the basis of a relational analysis called Grey and a productivity index called Malmquist. it helps in comparing dynamically the factors based on their identity and the different factors which are establishing a relation(Biswajit, 2014). The study uses variables which are categorized as efficiency scores which are developed from the work of Ante Pulic (2000). This approach requires the calculation of different components of capital which includes Human invested capital, structural invested capital. The financials were calculated in the form of ratios where two periods which are classified into pre knowledge management and post knowledge management. Yearly efficiency ratios were calculated on the basis of average over the years and the comparisons were made between the firms. (Castillo, 2003). Some of the studies have used content analysis and multiple regression methods. The information is analyzed from the same ideal components such as human, relational and organizational capital. Correlation method is used. Content analysis codes the quantitative and qualitative information(Wee & Chua, 2013). Most of the studies used regression and correlation statistical tools, the use of data processing

and the method used was path analysis and it was used to estimate the strength of causal relationship. The effect on the variables which is defined as dependent was used to valuate a direct and indirect effect(Ermawati et al., 2017).

Indian Automobile Sector

The first intellectual capital reporting in India happened in the year 1997 by Reliance Industries ltd, followed by two other companies, while the European and other western countries have already published their intellectual capital reporting in a structured format. The Indian reports had only a narrative style where the details were given in general and no specific details about the components were mentioned. Components were made very specific by disclosures made by other countries who have initiated the process long back(Pablos, 2005). The automobile sector in India is dominated by the original equipment manufacturers and the components manufacturers. It grows in leaps and bounds from the year 1991 as the industry policy and de-licensing after liberalization played its role. Major players from foreign auto companies took part in the India growth story by means of joint venture and mergers with Indian auto companies. The development of the country by means of infrastructure and a stable growth in the economy supported the growth of the automobile industry to a large extent.

In India there is an institutional context which most often is unstable and the development is dynamic, Indian market is a dynamic and emerging market the problem with this is the statistical data extrapolation techniques which are used are hardly defensible and research has to be on the lookout for more future outlook-based approach(Kuklinski et al., 2014). Most of the literature in the auto industry suggested that the companies in the industry should focus on four enables of knowledge. They are referred to be the key in the industry such as sharing of information, communication with the organization, feedback and promotion policy. It also revealed that only two out of every 10 companies adopt to the four enablers(Nair et al., 2015).

The challenges impacting the Indian automotive industry is the improvement of roads and laws for traffic regulation and enforcement. The impact of traffic congestion should be reduced. Moreover, increase in port capacity for the export of vehicles should be improved(Kumar, 2018). A report generated in February 2017 states that India is known as the fastest growing market for cars. India, when referred to the auto sector is known for its dominance in the two-wheel segment and tractor segment. The predominant factor for this sector to dominate is its link to other key sectors of the

economy. Direct and indirect employment are derived from this industry as over 20 million people are dependent on this industry for jobs. The FDI in this industry expands and also more of the international companies are found to set base in India for enhancing their production capacity as there is availability of cost-effective labor in India. Export contribution of this sector also has increased (Accord Fintech, 2018).

Chapter Summary

The above literature conducted was surveyed from Journals, Articles, Research archives and documents. An inquiry was originally developed with the concept of intangible assets, knowledge management and intellectual resources was researched. The determinants of intellectual capital were clearly defined and the various models of intellectual capital was identified and most of the literature supports the value-added concept and its intellectual capital and the value of firm performance was evaluated in detail. Most of the research methods on intellectual capital revealed that the method used was regression to establish the associate between intellectual capital and other components. The studies related to Indian environment reveals that India is developing as an emerging economy. Analyzing the Indian automobile industry showed a growing trend for the past two decade and during the year 2017 the industry faced several setbacks as there were changes in the tax laws, the introduction of GST and its after effects. The laws governing the industry and the introduction of electric cars has given a paradigm shift to the way the industry functions and much attention was laid towards the industry by the Government.

Methodology

This chapter discusses the processes taken in achieving the objectives led out for this study. First, having done a brief on the theoretical framework, a model, key variables, data sources and economic techniques used are presented.

Statement of the Problem

The association of intellectual capital in financial performance of a firm is also a very important link which cannot be ignored. Traditional accounting has completely ignored its significance as there are many accounting distortions and new age corporate does not find an appropriate tool to measure intellectual capital. Moreover, research has proved in several occasions that the return earned by the use of intellectual capital has gained more popularity and strength rather than the return earned by the use of financial capital. To establish growth and profitability of a firm it is essential to understand the effect of intellectual capital and how it increasingly gains prominence. The study

identifies the existing problem of the underplayed role of intellectual capital through the following. Attention has to be given to this capital as it helps (Nazari, 2010).

- Corporates to identify and establish their strategies.
- Plays an important role in the process of making decision.
- Provides adequate communication to most stakeholders in terms of the value of the firm
- Helps in measuring and identifying the value additivity of corporates.

Literature clearly states that the problem is the inadequacy of research in the area and also the presence of the factors influencing the intellectual capital so as a major contributor of value of a firm. Moreover, though there are numerous studies which helps to identify the reason as to the bigger difference amidst the book and market value of firms. No single study has given a complete framework to explain the gap that lies between market value and book value of companies. The study is most essential in the current scenario as the nature and combination of asset structure.

Scope of the study

Intellectual capital is identified as the most important enabler of the financial performance of a firm and taking into consideration today's economy which is led by knowledge the concept has greatly evolved as undisputable for the value enhancement of an enterprise. The current research is conducted to examine the effects of intellectual capital along with its key components human, structural and capital employed on the financial performance of companies representing the automobile sector in India and the intensity of the influence of intellectual capital is measured using the age-old technique of value-added intellectual capital. The scope of the study is limited to the automobile companies listed in the Indian Stock market and since the Nifty auto stands as a representation of all the automobile companies the study conducted in the sector is considered vital and need of the hour.

Research Question

1. What are the factors that influence measurement of intellectual capital?
2. How are the value of intellectual capital estimated in the automobile sector?
3. What is the impact of Intellectual Capital on the financial performance of companies in the automobile sector?
4. Is it possible to design a framework for intellectual capita disclosures?

Objectives of study

1. To investigate the factors influencing the measurement of intellectual capital through a detailed systematic literature review.
2. To estimate the intellectual capital value for select automobile firms in India and rank them.
3. To measure influence of intellectual capital in the enterprise financial performance in the Indian automobile sector.
4. To develop a framework depicting intellectual capital disclosure requirements.

The Model of the Study

This study fit a regression model to establish the relationship between the selected variables. Here a multiple linear regression is fitted on the dependent variables including Assets Turnover (ATO), Return on Assets (ROA), Return on Equity (ROE), Return on invested capital (ROI), Firms EPS, and Price to book value and other independent variables selected for this work. The independent variables include: (1) Capital employed efficiency (CEE); the indicator of VA efficiency of capital .employed; (2) Human capital efficiency (HCE) – the indicator of VA efficiency of human capital; and (3) Structural capital efficiency (SCE) – the indicator of VA efficiency of structural capital (Ghosh & Mondal, 2009). The regression model establishes whether or not there is any relationship between the dependent variable and the predictor variables. For the purpose of this study, a multiple regression model is specified to explain the impact of the independent variables on the dependent variables. Implicitly, it is expressed as:

$$\Delta Y_t = \alpha_0 + \sum_{t-1}^{n} \beta_i \Delta X_{t-1} + \varepsilon_t \quad \text{..... Eqn 1}$$

Model : $Y_t = \beta Vaic + \beta Size + \beta Leverage + \varepsilon_t$ ..... **Eqn**

Y_t in equation above represents the series of dependent variables including; Assets Turnover (ATO), Return on Assets (ROA), Return on Equity (ROE), Return on invested capital (ROI), Firms (EPS), Enterprise Value (EV) and Price to Book value (MB)s

Description of Variables

Financial Performance

It indicates the financial sustainability of an enterprise over a time period and serves as an indicator for comparison either across similar industry or across sectors. The financial performance with reference to the study is measured by ratios such as

profitability, Activity, capital return, value creation using ROA, ROE, Enterprise value, Asset Turnover, PE ratio and M/B ratio.

Intellectual capital

It is the intangible value of a firm that is represented by assets which also includes the knowledge and expertise of the human resource, the process involved in organization and the total knowledge that exist within the organization and the capital invested.

Human Capital

Human capital is often referred to skills of employees, knowledge base of a firm, Attitude and culture of the workforce. Intellectual capital states that the quotient could be increased by the increasing the ability of the employees. This capital is generally referred to the abilities, skill and intellectual knowledge of the individual employees who generally provide solution to all the customers' queries each and every individual employee who provide solution to customers.

Structural Capital

Structural capital refers to a varied range of systems and procedures that exist in a firm which includes patents, concepts, models and computer and administrative complex procedures and systems. They are created, modeled or owned by the organization and follow it. Some of the components denoting structural capital have been purchased.

VAIC

The method developed by Ante Public (1998, 2000) forms the structure for measuring the intellectual capital for a corporate. In his words he states that this model is a framework designed to help enable the various stakeholders to understand, evaluate and monitor the firm and to identify the efficiency of Value Added(VA) by a firm's total resources and each major resource component. VAIC is the sum of three indicators. These are: (1) Capital employed efficiency (CEE) – the indicator of VA efficiency of capital .employed; (2) Human capital efficiency (HCE) – the indicator of VA efficiency of human capital; and (3) Structural capital efficiency (SCE) – the indicator of VA efficiency of structural capital"(Ghosh & Mondal, 2009).

Data Sources and Collection

Analysis of Data

The study proposes the value invested added intellectual capital model and the model using is regression and it is used to examine and evaluate the relation amidst

VAIC and with the financial performance. It is conducted in the sector of automobile in India. The sample is fifteen auto companies selected by the nifty auto index. The data is through yearly reports gone public by the company and the period of study is 10 years ranging from the year 2008 to the year 2018. The financial data and information required for the study were drawn from the secondary source. The Prowess corporate databases developed by CMIE (Centre for Monitoring Indian Economy) and CLP (Capital Line Plus) have been used as principal sources. The other relevant data were collected from Journals, Magazines, Websites and Dailies.

Estimation Techniques

Panel Descriptive analysis

Preliminary investigations are done by way of descriptive analysis. The measures of central tendencies, skewness, Jaque-bera and other parameters investigated.

Panel Ordinary Least Square (OLS) Regression technique of Estimation - The study uses the Ordinary Least Square estimation technique to assess the effect of VAIC on financial performance. To do this, the pooled OLS, Fixed effect OLS and the Random effect is analyzed.

Pooled OLS model- The pooled OLS denies the distinction existing among the **N** samples (companies) in consideration. Here, the assumptions are that the all firms in the model possess same characteristics

Fixed Effect (LSDV) model- This model allows for heterogeneity. It takes into consideration the unique characteristics which the different firms in the model possess. The assumptions are that though intercept may vary across the **N** samples they don't vary over time.

Random Effect model- This model assumes that all have common mean and possess common intercept.

The Hausman test

The Hausman test is used to choose which model (fixed or random) to adopt for the analysis. For this reason, the study verifies the hypothesis as stated below. **Null**: Random effect model is appropriate; **Alternative**; fixed effect model is appropriate. If the Pval <5%, then the null hypothesis is rejected and the alternative hypothesis accepted. If Pval >5%, null hypothesis is accepted and alternative rejected.

Hypothesis

H_1: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on a firm's ASSET TURNOVER.

H_2: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on a firm's ROA.

H_3: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on a firm's ROE.

H_4: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on a firm's ROI.

H_5: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on a firm's EPS.

H_6: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on a firm's Enterprise Value.

H_7: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on a firm's PRICE/BOOKVALUE.

Limitations of the study

1. The data for the study was collected from an index of a given sector so the findings could not be generalized to a larger population.
2. The study had considered only ten years of data for its analysis.
3. The study had considered only the important components of intellectual components such as structural, human and capital employed. But other variables such as societal and relational capital could have been considered.

Conceptual framework showing the Intellectual capital and Financial Performance

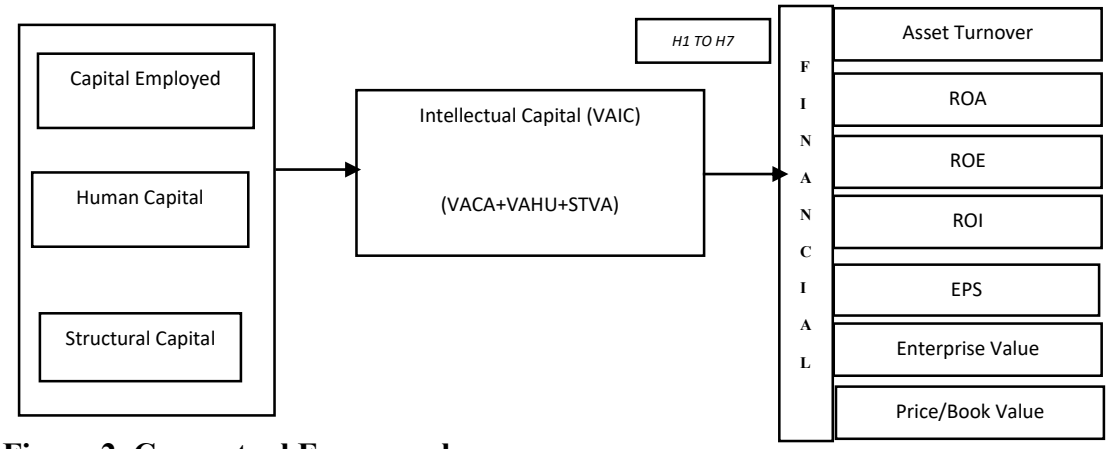


Figure 2. Conceptual Framework

The researcher will attempt to fit a regression model to establish the relationship between two or more variable, here a multiple linear regression is fitted using a dependent variables such as Assets Turnover, return on Assets, return on Equity, return

on invested capital, Basic EPS, Ev/net operating revenue and Price to book value and other independent variables selected for this work. The regression model tries to establish whether or not there is any relationship between the dependent variable and the predictor variables. All analysis to this work is carried out on EViews 9.

Sampling Frame

Proposed sample frame will be all the listed companies in NIFTY – AUTO. The proposed sample size is 15 companies for a period of 10 years.

Data collection

Proposed sample frame will be all the listed companies in NIFTY – AUTO. The proposed sample size is 15 companies for a period of 10 years. The required data for this study is collected in detail from the published reports which are released annually of the automobile companies which are listed under nifty auto. Collection of data is through published yearly reports related to sample units. Extracts of income statement, balance sheet data and other non-financial data will be recorded in excel and later analyzed using the required statistical tool.

Data analysis and data Interpretation

Analysis of Data

The study proposes the value invested added intellectual capital model and the model using is regression and it is used to examine and evaluate the relation amidst VAIC and with the financial performance of and stock return. It is conducted in the sector of automobile in India. The sample is fifteen auto companies selected by the nifty auto index. The data is through yearly reports gone public by the company and the period of study is 10 years ranging from the year 2008 to the year 2018.

Testing of the Measurement Model

Selection of dependent variables

The variables Asset Turnover, Return on Assets, Return on Equity, Return on Invested Capital, Basic EPS, Enterprise Value/Net Operating Revenue, Price/BV representing financial performance indicators by a firm are classified as dependent variable.

Nifty Auto Index

Index related to the automobile industry is the NIFTY AUTO – it is specifically related to reflect the performance and the trend of the automobile industry in India. The computation of the index is through free float – market capitalization having a value of index as 1000. The NIFTY Auto Index is designed to reflect the behavior and

performance of the Indian automobile sector. It is computed using free float market capitalization method with an index value of 1000. It communicates the general trend reflecting the sector including the car and bike manufacturers, auto and heavy vehicle, ancillary industry, tires and other related units. It has 15 stocks and these are listed in the NSE.

Independent Variables

Along with firm size and financial leverage, "Value added" is employed as indicator which measures IC. The classification is generally based on "value added intellectual capital" - (VAIC) method was initiated by Pulic (1998). Pulic (1998) defined it as "how much and how efficiently IC and capital employed create values in the firm. Pulic (1998) categorized IC into three main components: Structural capital, Human capital and Capital employed capital".

Testing the VAIC Model

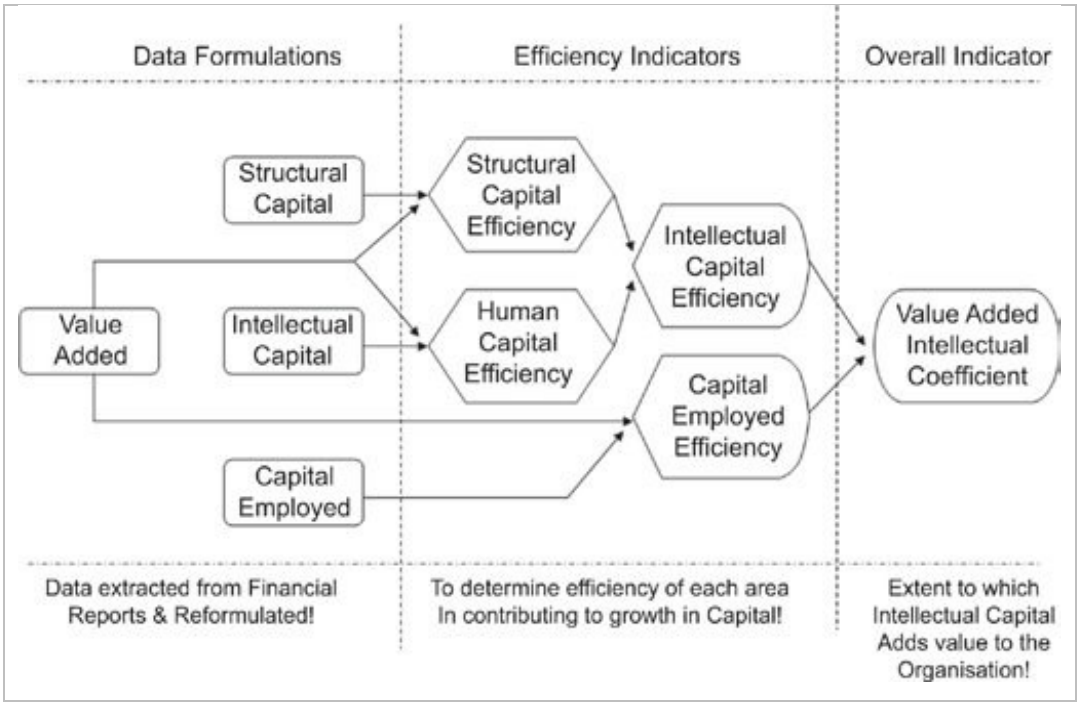


Figure 3. Model Structure – Independent Variables

The stakeholders generally benefit through the profits shown through the books in accounts. They believe that it reflects the true value and it is a more tangible of methods. It proves that it conveys the message about the performance of a company. Any activity of a firm generally in the end is tuned towards making profits. (Sentosa, 2012). The method is designed to give the news about how the company can create

value efficiently by putting to use its tangible and intangible assets that are owned by companies. The framework model is giving a picture of creating value that is Va. It is an indicator which is objective and it measures the success of any business. It shows the business the path to create more value (Turner, Zimmerman & Allen, 2012).

(Stewart, 1998) a firm which considers its greatest strength as humans and believes that the stairs towers success begins with its human resources which is a source from where all innovation begins and sustains. Tough financial resources are available in abundant it cannot think only humans can do the thinking. Machines perform better than humans in many cases but it does not have the capacity to think. The calculation of structural capital as referred by (pulic, 2000) is quite different when oompahed to the other researchers of how the computation has been made. Structural capital is what remains after the human capital element is deducted from the total value added (Tan et Table 1al, 2007). Testing the model was a great challenge as the records made by data collection had to be interpreted at each level at every stage and appropriate accounting calculation and interpretation was made.

Result analysis

Calculation of VAIC

The index is the sum of the various ratios of how much of value is added to the capital employed and human capital. It calculates the total efficiency of a company and its intellectual capital efficiency.

Table 1 Calculation of VAIC

STEPS	LABEL	FORMULA	DESCRIPTION
1	VALUE ADDED (VA)	VA=OUT – IN	OUT= revenues include all products and services sold in the market.IN = all expenses for operating a company
2	HUMAN CAPITAL EFFICIENCY	HCE= VA/HC	HC= Total investment in terms of salaries and wages of the staff
3	STRUCTURAL CAPITAL EFFICIENCY	SCE= SC/VA	SC=VA-HC
4	INTELLECTUAL CAPITAL EFFICIENCY	ICE=HCE+SCE	

5	CAPITAL EMPLOYED EFFICIENCY	CEE=VA/CA	CA=Book value of net assets
6	VALUE ADDED INTELLECTUAL COEFFICIENT	VAIC=ICE+CEE	

Table 2 Components of intellectual capital for Sample Automobile Companies

S. No	Company Name	CEE	HCE	SCE	VAIC
1	M&M	0.4400	2.0900	0.5000	3.0300
2	Exide Industries	0.2000	3.9800	0.7400	4.9200
3	Ashok Leyland	0.1700	2.6800	0.5800	3.4300
4	Tata Motors	1.0200	2.9600	0.6500	4.6300
5	Eicher Motors	0.2300	3.5000	0.6400	4.3600
6	Amara	0.3700	5.0000	0.8000	6.1600
7	Apollo	0.3700	2.2900	0.5600	3.2200
8	Bajaj	0.3400	6.1600	0.8200	7.3100
9	Bosch	0.5800	2.4900	0.5900	3.6600
10	Motherson	0.4700	1.6500	0.3900	2.5000
11	Tvs	0.2700	2.4300	0.5900	3.2900
12	Bharat	0.2000	5.4800	0.8200	6.5000
13	MRF	0.2300	2.9600	0.5600	3.7600
14	Hero	0.4900	5.7600	0.8200	7.0800
15	Maruthi	0.1300	3.4500	0.6500	4.2200

The results of the automobile companies' intellectual capabilities are calculated by analyzing each of the firms human, structure and capital employed. The efficiency indicators act as a first step towards proceeding with the research for further statistical analysis using regression methods. Study identifies that more than 70% of the corporates state that the value of the intellectual capability existing in the industry has contributed towards better financial performance of the company. majority of the company nicators that IC reflecting human capital plays a major role. taking for example the company Bajaj the overall intellectual capital quotient is higher indicating a contributing of human capital efficiency at 6.1600. consider the index of Eicher Motor the contribution is higher by the human capital. But whirrs companies like Tata motors show an equal contribution by all efficiency indicators leading to an overall intellectual capital index of 5.6300.

Results and discussion of the companies are given and the results of the study propose a general measure to assess the efficiency of the intellectual capital of the company as a result of the firm's intellectual abilities. The results of the study from the data extracted from the company through Value added intellectual capital and its components as independent variable and the various variables used for financial performance analysis gives out the following findings.

Table 3 Panel Descriptive Statistics

	ATO	CEE	EPS	EVA	HCE	LEV	PE	ROA	ROE	ROI	SC	SIZE	VAIC
Mean	1.3	0.4	206.4	3.0	3.6	2.9	2.8	10.3	23.0	17.6	0.7	0.6	4.6
Median	1.2	0.3	26.4	1.9	2.9	2.5	1.8	8.6	21.7	14.9	0.6	0.6	4.1
Maximum	2.6	3.0	3421.4	16.8	8.9	22.7	13.5	39.5	91.8	74.8	0.9	1.0	10.1
Minimum	0.6	0.1	-45.6	0.0	1.3	1.2	0.0	-9.5	-86.1	-8.4	0.2	0.2	1.6
Std. Dev.	0.5	0.3	546.1	3.0	1.7	2.1	2.8	7.7	16.1	12.1	0.2	0.2	1.8
Skewness	0.5	4.5	4.2	2.1	0.9	6.1	1.8	0.8	-1.1	1.7	-0.6	0.0	0.7
Kurtosis	2.5	32.7	21.6	7.5	3.0	57.2	5.9	3.9	18.6	7.6	2.6	2.2	2.8
Jarque-Bera	8.8	6011.3	2607.9	234.8	19.0	19277.2	128.5	21.5	1544.2	202.9	8.6	4.2	13.4
Prob	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00
Obs.	150	150	150	150	150	150	150	150	150	150	150	150	150

Source: Authors Computation using Eviews 9

ATO = Assets Turnover; ROA = Return on Assets; ROE = Return on Equity; ROI= Return on invested capital; EPS= Firms EPS, PE= Price to book value; CCE= Capital employed efficiency LEV= Firms Financial Leverage; HCE= Human capital efficiency; SCE= Structural capital efficiency (SCE); Size = Firms Size; EVA = Firms Enterprise Value.

In the period under consideration, a total of about 150 *n*- observation of samples was collected. Assets Turnover (ATO); averages about 1.3 ranging between 0.6 and 2.6 with a standard deviation of 0.5 The Jarque-bera is significant. This implies that ATO is normally distributed. The mean Capital employed efficiency (CEE) is 0.4. It varies between a minimum of 0.1 to a maximum of about 3.0. Firms EPS has a minimum value of -45.6, a maximum value of 3,421.5 and a standard deviation of 546.1. While Firms Enterprise Value (EVA) has 3.0, 0.0, and 16.8, to represents mean, minimum value and maximum value, Human Capital Efficiency (HCE) has 3.6, 1.3 and 8.9 to represent mean, minimum and maximum value respectively. For Firms Financial Leverage (LEV), the mean value is 2.9 with a standard deviation of 2.1. It ranges between 1.2 and 22.7. The mean, minimum, maximum and standard deviation of Return on Assets (ROA), Return on Equity (ROE), and Return on invested capital (ROI), are (10.3, -9.5, 39.5); (23.0, -86.1, 91.8) and (17.6, -8.4 and 74.8) respectively. Structural capital

efficiency (SCE) went as high as 0.9 with an all-time low of 0.2. It averaged 0.7 for the period. Similarly, while the mean, minimum value and maximum value of firm size was 0.6, 0.2 and 1.0, that of VAIC is 4.6, 1.6 and 10.1. The distribution is normally distributed as indicated by Jarque-bera. This is confirmed by the probability value (p = 0.0000) for all variable except GS which has a probability value (p= 0.0015) revealing a significant position. The skewness and Kurtosis which shows the asymmetric nature of the observation indicates a positive skewness (right skew) and is relatively high value for most of the variables.

Variable Graphing

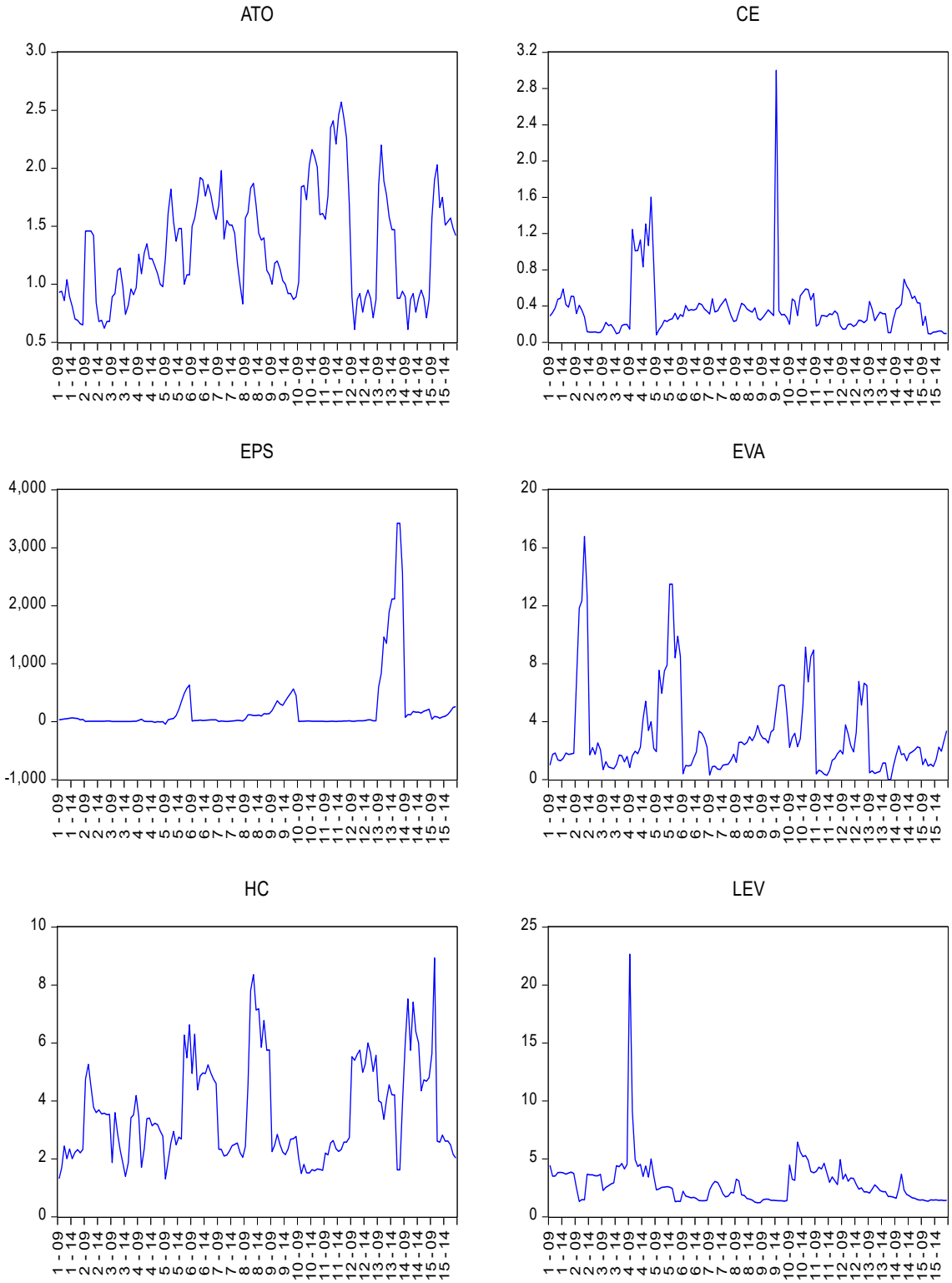
When dealing with time series data, it is important to investigate whether the series are stationary or not, because the regression of non-stationary series on another may yield spurious results. According to Engle and Granger, the parameter estimates from such a regression may be biased and inconsistent. One way of understanding if series are stationary is to graph the variables. The test is conducted with intercept and no trend (t) or intercept and trend. This decision is made upon graphing the series(Bilgili, n.d.). Each of the series as stated by the equation below.

$$\Delta Y_{it} = \alpha + \beta_{it} + \delta Y i_{t-1} + \sum_{t-1}^{m} \Delta Y + \varepsilon_{it}$$

$$\Delta Y_{it} = \alpha + \delta Y_{it-1} + \sum_{i\ t-1}^{m} \Delta Y + \varepsilon_{it}$$

Equation 1 above represents intercept and trend, while equation 2 represents intercept and no trend in series, α represents the drift, t represents deterministic trend and m is a lag length large enough to ensure that ɛ is a white noise process. Mean reverting

variables are stationary.



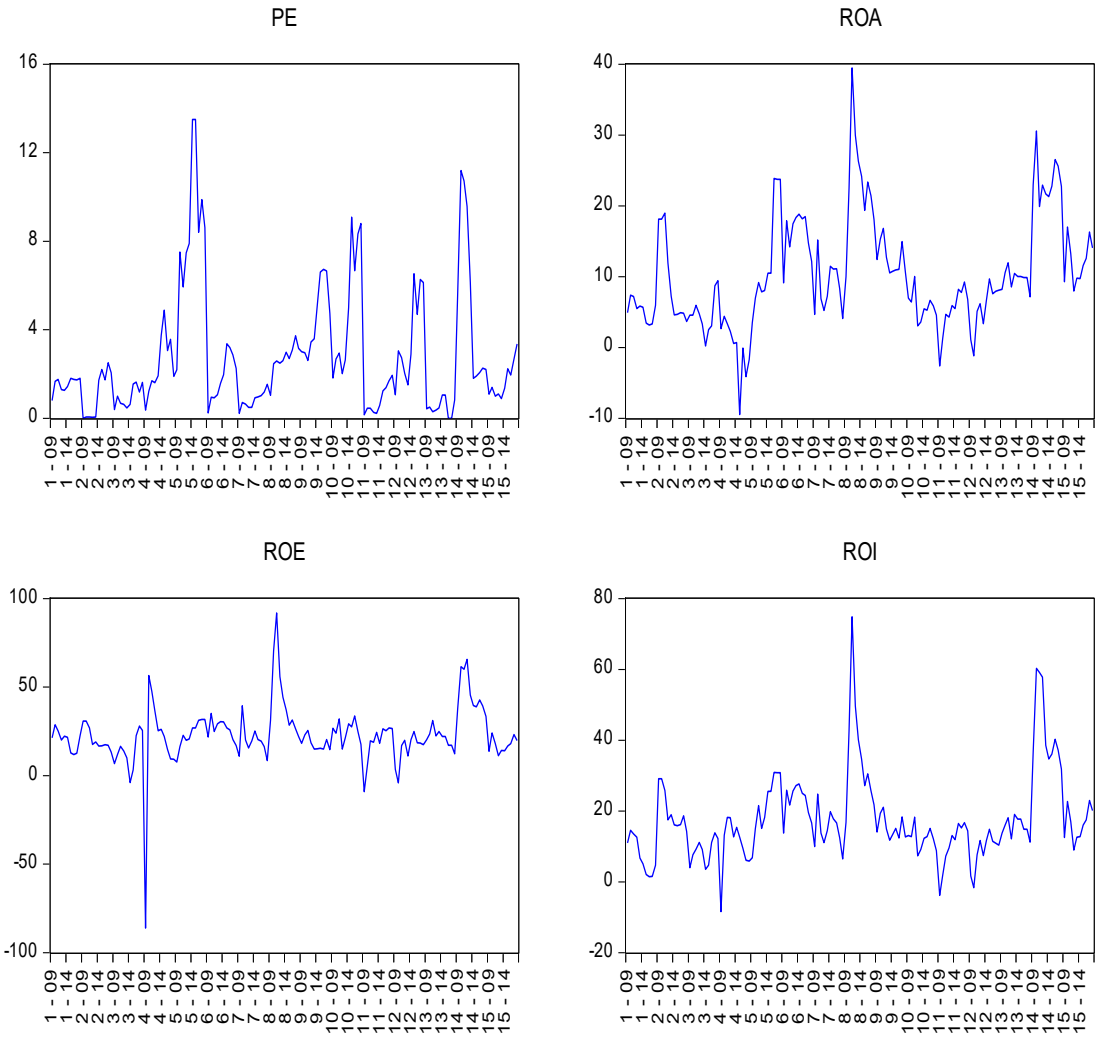


Figure 4. Descriptive Statistics

ATO = Assets Turnover; ROA = Return on Assets; ROE = Return on Equity; ROI= Return on invested capital; EPS= Firms EPS, PE= Price to book value; CCE= Capital employed efficiency LEV= Firms Financial Leverage; HCE= Human capital efficiency; SCE= Structural capital efficiency (SCE); Size = Firms Size; EVA = Firms Enterprise Value.

Evidently, the variables are all mean reverting. They are not trending upwards or downwards.

Result of Panel Least Square Estimations

H_1: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on asset Turnover (ATO)

Dependent variable: ATO

Data Period: 2009 – 2018

Method: Panel Least Square

Cross Section included: 15

No. of Observation: 150

Table 4 Least Squares estimates for Asset Turnover

Fully modified least squares estimates

Variable	Pooled	Fixed	Random
Constant	1.5583 (6.1527)	1.5226 (6.0491)	1.5465 (6.1477)
VAIC	0.0106 (0.1070)	-0.0242 (-0.2402)	-0.0011 (-0.0111)
Firm Size	-0.4350 (-0.409)	-0.1003 (-0.0934)	-0.3226 (-0.3060)
Financial Leverage	-0.0073 (-0.381)	-0.0122 (-0.6320)	-0.0089 (-0.4708)
R-square	0.0136	0.1045	0.0149
Adjusted R-square	-0.006	0.0261	-0.0053
Durbin Watson Stat	0.2084	0.1880	0.2013
Prob (F-statistic)	0.5707	0.2068	0.5320

Note: M1 = Model 1 is the Pooled OLS estimation, M2 = Model 2 is the Fixed OLS estimation, M3 = Model 3 is the Random OLS estimation. Values in parenthesis are the t-statistics. Asterisk (*) indicates significance. *** Indicates 1% significance level. ** Indicates 5%significance level while * Indicates 10%significance level.

Hausman LM Test

Correlated Random Effects- Hausman Test

Test Summary	Chi-Sq Stat.	Chi-Sq.	Prob.
Period random	3.0125	3	0.3897

Source: Authors Computation using E-views 9

The table above shows the result of estimation using the pooled, fixed, random OLS technique with their corresponding coefficient, standard errors, t-statistics and probability values. The R-square and adjusted R- square are very low indicating that 1%, 10% and 1% of the variations in the dependent variable are explained by the independent variables. The Durbin Watson stat also shows no autocorrelation. To understand which of the model to adopt, the Hausman test was performed. The result by Hausman test is not significant (X^2 = 3. 01, d.f = 3, P= 0.389). This implies that the result would be based on the random model. Based on this result, the result is presented as follows. Based on the output of Random OLS, a unit increase in VAIC causes a decrease in Asset turn Over (ATO) by 0.001%. Firm size is negative (Beta = - 0.322, P = 0.760) and does not significantly affect ATO. Similarly, the financial leverage is negative and not significant (Beta = - 0.008, P = 0.638). So, VAIC, Firm Size and Financial Leverage does not affect Asset Turn Over (ATO).

H_2: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on a firm's ROA.

Result of Panel Least Square Estimations

Dependent variable: ROA

Data Period: 2009 – 2018

Method: Panel Least Square

Cross Section included: 15

No. of Observation: 150

Table 5 Least Squares estimates for Return on Asset

	Fully modified least squares estimates		
Variable	Pooled	Fixed	Random
Constant	11.0407***	12.3954***	11.0407
	(3.8032)	(2.8378)	(3.7570)
VAIC	5.8577***	6.0954***	5.0605
	(5.1226)	(5.1148)	(5.0605)
Firm Size	-38.875***	-41.3673***	-38.8755
	(-3.1938)	(-3.2676)	(-3.1550)
Financial Leverage	-1.1297***	-1.0870***	-1.1297
	(-5.1293)	(-4.7675)	(-5.0670)
R-square	0.5177	0.5362	0.5175
Adjusted R-square	0.5078	0.4956	0.5078
Durbin Watson Stat	0.5031	0.4408	0.5031
Prob (F-statistic)	0.0000	0.0000	0.0000

Note: M1 = Model 1 is the Pooled OLS estimation, M2 = Model 2 is the Fixed OLS estimation, M3 = Model 3 is the Random OLS estimation. Values in parenthesis are the t-statistics. Asterisk (*) indicates significance. *** Indicates 1% significance level. ** Indicates 5%significance level while * Indicates 10%significance level.

Hausman LM Test

Correlated Random Effects- Hausman Test

Test Summary	Chi-Sq Stat.	Chi-Sq.	Prob.
Period random	0.8401	3	0.8398

Source: Authors Computation using E-views 9

The table above shows the result of estimation using the pooled, fixed, random OLS technique with their corresponding coefficient, standard errors, t-statistics and

probability values. The R-square and adjusted R- square are very low indicating that 51%, 53% and 51% of the variations in the dependent variable are explained by the independent variables. The Durbin Watson stat also shows no autocorrelation. To understand which of the model to adopt, the Hausman test was performed. The result by Hausman test is not significant ($X^2 = 0.840$, d.f = 3, P= 0.839). This implies that the result would be based on the random model. Based on this result by the Hausman test, the Random OLS is presented as follows: A unit increase in VAIC causes an increase in (ROA) by 5.85 units. Firm size is negative (Beta = - 38.87, P = 0.000) and significantly affect ROA. This implies as the firm expands in size, Return on Asset reduces by 38.87 units. Similarly, the financial leverage is negative and significant (Beta = - 1.129, P = 0.000). This implies as the firm financial leverages improve, the Return on Asset reduces by 1.129 units. So, VAIC, Firm Size and Financial Leverage all significantly affect Return on Asset.

H_3: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on a firm's ROE.

Result of Panel Least Square Estimations

Dependent variable: ROE

Data Period: 2009 – 2018

Method: Panel Least Square

Cross Section included: 15

No. of Observation: 150

Table 6 Least Squares estimates for Return on Equity

	Fully modified least squares estimates		
Variable	Pooled	Fixed	Random
Constant	30.8432***	31.9316***	31.3372
	(4.3315)	(4.6015)	(4.4953)
VAIC	8.6797***	9.0149***	8.8248
	(3.0945)	(3.2372)	(3.2187)
Firm Size	-62.935**	-67.9251***	-65.1510
	(-2.1079)	(-2.2957)	(-2.2344)
Financial Leverage	-2.8786***	-2.7025***	-2.7981
	(-5.3283)	(-5.0714)	(-5.3148)
R-square	0.3353	0.4197	0.3377
Adjusted R-square	0.3216	0.3689	0.3241

Durbin Watson Stat	24.555	0.8741	12.831
Prob (F-statistic)	0.0000	0.0000	0.0000

Note: M1 = Model 1 is the Pooled OLS estimation, M2 = Model 2 is the Fixed OLS estimation, M3 = Model 3 is the Random OLS estimation. Values in parenthesis are the t-statistics. Asterisk (*) indicates significance. *** Indicates 1% significance level. ** Indicates 5%significance level while * Indicates 10%significance level.

Hausman LM Test

Correlated Random Effects- Hausman Test

Test Summary	Chi-Sq Stat.	Chi-Sq.	Prob.
Period random	4.5425	3	0.2085

Source: Authors Computation using E-views 9

The table above shows the result of estimation of the pooled, fixed, random OLS technique with their corresponding coefficient, standard errors, t-statistics and probability values. The R-square and adjusted R- square are very low indicating that 33%, 41% and 33% of the variations in the dependent variable are explained by the independent variables. The Durbin Watson stat also shows no autocorrelation. To understand which of the model to adopt, the Hausman test was performed. The result by Hausman test is not significant (X^2 = 4.5425, d.f = 3, P= 0.2085). This implies that the result would be based on the random model. Based on this result by the Hausman test, the Random OLS is presented as follows:

VAIC is significant and positively related with Return on Equity (ROE). Its coefficient (Beta = - 8.824, P = 0.000) implies that a unit increase in VAIC causes an increase in ROE by 8.824 units. Firm size is negative (Beta = - 65.151, P = 0.000) and significantly affect ROE. This implies as the firm expands in size, Return on Equity reduces by 65.15 units. Similarly, the financial leverage is negative and significant (Beta = - 2.798, P = 0.000). This implies as the firm financial leverages improve, the Return on Equity reduces by 2.798 units. So, VAIC, Firm Size and Financial Leverage all significantly explain Return on Equity.

H_4: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on a firm's ROI.

Result of Panel Least Square Estimations

Dependent variable: ROI

Data Period: 2009 – 2018

Method: Panel Least Square

Cross Section included: 15

No. of Observation: 150

Table 7 Least Squares estimates for Return on Investment

	Fully modified least squares estimates		
Variable	Pooled	Fixed	Random
Constant	16.990 ***	17.9439***	17.3183***
	(3.6061)	(3.8126)	(3.6807)
VAIC	9.5753***	10.1079***	9.7556***
	(5.1595)	(5.3518)	(5.2639)
Firm Size	-63.1488***	-69.0656***	-65.1719 ***
	(-3.1966)	(-3.4418)	(-3.3054)
Financial Leverage	-1.3100***	-1.2001***	-2.7981***
	(-3.6646)	(-3.3208)	(-3.5718)
R-square	0.4877	0.5301	0.3377
Adjusted R-square	0.4772	0.4890	0.3241
Durbin Watson Stat	0.5606	0.4664	12.831
Prob (F-statistic)	0.0000	0.0000	0.0000

Note: M1 = Model 1 is the Pooled OLS estimation, M2 = Model 2 is the Fixed OLS estimation, M3 = Model 3 is the Random OLS estimation. Values in parenthesis are the t-statistics. Asterisk (*) indicates significance. *** Indicates 1% significance level. ** Indicates 5%significance level while * Indicates 10%significance level.

Hausman LM Test

Correlated Random Effects- Hausman Test

Test Summary	Chi-Sq Stat.	Chi-Sq.	Prob.
Period random	1.9263	3	0.5878

Source: Authors Computation using E-views 9

The table above shows the result of estimation of the pooled, fixed, random OLS technique with their corresponding coefficient, standard errors, t-statistics and probability values. The R-square and adjusted R- square are very low indicating that 48%, 58% and 34% of the variations in the dependent variable are explained by the independent variables. The result by Hausman test is not significant (X^2 = 1.9263, d.f =

3, P= 0.5878). This implies that the result would be based on the random model. Based on this result by the Hausman test, the Random OLS is presented as follows:

VAIC is significant and positively related with Return on Investment (ROI). Its coefficient (Beta = 9.7568, P = 0.000) implies that a unit increase in VAIC causes an increase in RO1 by 9.756 units. Firm size is negative (Beta = - 65.1719, P = 0.001) and significantly affect ROI. This implies as the firm expands in size, Return on Investment reduces by 65.17 units. Similarly, the financial leverage is negative and significant (Beta = - 1.272, P = 0.000). This implies that as the firm financial leverages increase, the Return on Investment reduces by 1.272 units. So, VAIC, Firm Size and Financial Leverage all significantly explain Return on Investment (ROI).

H_5: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on a firm's EPS.

Result of Panel Least Square Estimations

Dependent variable: EPS

Data Period: 2009 – 2018

Method: Panel Least Square

Cross Section included: 15

No. of Observation: 150

Table 8 Least Squares estimates for Asset Turnover

	Fully modified least squares estimates		
Variable	Pooled	Fixed	Random
Constant	586.76 **	634.466**	586.764**
	(2.0117)	(2.1097)	(1.9714)
VAIC	42.5413	79.7269	42.5413
	(0.3702)	(0.6606)	(0.3628)
Firm Size	-699.72	-1079.57	-699.723
	(-0.5721)	(-3.4418)	(-0.5607)
Financial Leverage	-47.8545**	-40.8761**	-47.8545**
	(-2.1623)	(-1.7700)	(-2.1191)
R-square	0.0344	0.0566	0.0344
Adjusted R-square	0.0146	0.0260	0.0146
Durbin Watson Stat	0.0876	0.0767	0.0876
Prob (F-statistic)	0.1620	0.7634	0.1620

Note: M1 = Model 1 is the Pooled OLS estimation, M2 = Model 2 is the Fixed OLS estimation, M3 = Model 3 is the Random OLS estimation. Values in parenthesis are the t-statistics. Asterisk (*) indicates significance. *** Indicates 1% significance level. ** Indicates 5%significance level while * Indicates 10%significance level.

Hausman LM Test

Correlated Random Effects- Hausman Test

Test Summary	Chi-Sq Stat.	Chi-Sq.	Prob.
Period random	2.5218	3	0.4713

Source: Authors Computation using E-views 9

From the table above, the R-square and adjusted R- square of the pooled, fixed, random OLS estimation are 3%, 5% and 3% of the variations in the dependent variable are explained by the independent variables. The result by Hausman test is not significant (X^2 = 2.5218, d.f = 3, P= 0.4713). This implies that the result would be based on the random model. Based on this result by the Hausman test, the Random OLS is presented as follows:

VAIC is not significant but positively related with ***Firm's EPS.*** Its coefficient (Beta = 42.54, P = 0.7172) implies that a unit increase in VAIC causes an increase in ***Firm's EPS*** by 42.54 units. Firm size is negative (Beta = - 699.72, P = 0.5755) and not significant too. This implies as the firm expands in size, Firms EPS reduces by 699.7 units. Similarly, the financial leverage is negative and significant (Beta = - 47.854, P = 0.035). This implies that as the firm financial leverages increase, the ***Firm's EPS*** reduces by 47.854 units. Apparently, while VAIC and Firm Size do not explain the variations in Firms EPS, Financial Leverage significantly explain ***Firm's EPS***.

H_6: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on a firm's Enterprise Value.

Result of Panel Least Square Estimations

Dependent variable: EVA

Data Period: 2009 – 2018

Method: Panel Least Square

Cross Section included: 15

No. of Observation: 150

Table 9 Least Squares estimates for Economic Value added

	Fully modified least squares estimates		
Variable	Pooled	Fixed	Random

Constant	1.6317	1.6704	1.6317
	(1.0003)	(1.1646)	(0.9869)
VAIC	-0.5148	-0.2898	-0.5148
	(-0.8012)	(-0.4323)	(-0.7905)
Firm Size	6.6349	4.2637	6.6349
	(0.9701)	(0.5987)	(0.9571)
Financial Leverage	-0.1446	-0.0954	-0.1446
	(-1.1689)	(-0.7443)	(-1.1533)
R-square	0.0215	0.0566	0.0215
Adjusted R-square	0.0014	0.0260	0.0014
Durbin Watson Stat	0.3060	0.0767	0.3060
Prob (F-statistic)	0.3637	0.7634	0.3637

Note: M1 = Model 1 is the Pooled OLS estimation, M2 = Model 2 is the Fixed OLS estimation, M3 = Model 3 is the Random OLS estimation. Values in parenthesis are the t-statistics. Asterisk (*) indicates significance. *** Indicates 1% significance level. ** Indicates 5%significance level while * Indicates 10%significance level.

Hausman LM Test

Correlated Random Effects- Hausman Test

Test Summary	Chi-Sq Stat.	Chi-Sq.	Prob.
Period random	3.4928	3	0.3217

Source: Authors Computation using E-views 9

From the table above, the R-square and adjusted R- square of the pooled, fixed, random OLS estimation are 2%, 5% and 2% of the variations in the dependent variable are explained by the independent variables. The result by Hausman test is not significant (X^2 = 3.4928, d.f = 3, P= 0.3217). This implies that the result would be based on the random model. Based on this result by the Hausman test, the Random OLS is presented as follows:

VAIC is not significant but is negatively related with ***Firm's Enterprise Value.*** Its coefficient (Beta = -0.5148, P = 0.4305) implies that a unit increase in VAIC causes an increase in ***Firm's Enterprise Value*** by 0.514 units. Firm size is positive (Beta = 6.63, P = 0.340) and not significant too. This implies as the firm expands in size, ***Firm's Enterprise Value*** increases by 6.63 units. Similarly, the financial leverage is negative and not significant (Beta = - 0.1446, P = 0.250). This implies that as the firm financial

leverages increase, the ***Firm's Enterprise Value*** reduces by 0.1446 units. Apparently, VAIC, Firm Size and Financial Leverage do not explain ***Firm's Enterprise Value***.

H_7: VAIC, Financial Leverage, Size of firm have a positive and statistically significant influence on a firm's Price/Book value

Result of Panel Least Square Estimations

Dependent variable: PB/V

Data Period: 2009 – 2018

Method: Panel Least Square

Cross Section included: 15

No. of Observation: 150

Table 10 Least Squares estimates for Asset Turnover

	Fully modified least squares estimates		
Variable	Pooled	Fixed	Random
Constant	8.1680	8.5191	8.1680
	(1.7102)	(1.7483)	(1.6937)
VAIC	4.0548	4.4315	4.0554
	(2.1553)	(2.2662)	(2.1345)
Firm Size	-32.0456	-35.4879	-32.045
	(-1.6002)	(-1.7081)	(-1.5847)
Financial Leverage	-0.1102	-0.0824	-0.1102
	(-0.3043)	(-0.2202)	(-0.3013)
R-square	0.0715	0.1116	0.0715
Adjusted R-square	0.0524	0.0338	0.0524
Durbin Watson Stat	1.1904	1.1761	1.1904
Prob (F-statistic)	0.0124	0.1573	0.0124

Note: M1 = Model 1 is the Pooled OLS estimation, M2 = Model 2 is the Fixed OLS estimation, M3 = Model 3 is the Random OLS estimation. Values in parenthesis are the t-statistics. Asterisk (*) indicates significance. *** Indicates 1% significance level. ** Indicates 5%significance level while * Indicates 10%significance level.

Hausman LM Test

Correlated Random Effects- Hausman Test

Test Summary	Chi-Sq. Stat.	Chi-Sq.	Prob.
Period random	1.9296	3	0.5871

Source: Authors Computation using E-views 9

From the table above, the R-square and adjusted R- square of the pooled, fixed, random OLS estimation are 7%, 11% and 7% of the variations in the dependent variable are explained by the independent variables. The result by Hausman test is not significant (X^2 = 1.9296, d.f = 3, P= 0.5871). This implies that the result would be based on the random model. Based on this result by the Hausman test, the Random OLS is presented as follows:

VAIC is not significant but is positively related with the ***Firm's Price/Book Value.*** Its coefficient (Beta = 4.054, P = 0.034) implies that a unit increase in VAIC causes an increase in ***Firm's Price/Book Value*** by 4.054 units. Firm size is negative (Beta = -32.045, P = -1.584) and significant. This implies as the firm expands in size, ***Firm's Price/Book Value*** increases by 32.04 units. Similarly, the financial leverage is negative and not significant (Beta = - 0.1446, P = 0.250). This implies that as the firm financial leverages increase, the ***Firm's Price/Book Value*** reduces by 0.1102 units. Apparently, Firm Size and Financial Leverage do not explain ***Firm's Price/Book Value.***

"Firms gain competitive advantage and attain superior performance by holding, acquiring, and effectively using strategic assets. These assets include tangible, physical, assets as well as intangible assets that have been internalized, developed and used by firms in pursuing competitive and profitable strategies."

Consolidated findings of the Study:

Dependent Variables	**Independent Variables**		
	VIAC	**Firm size**	**Financial Leverage**
Asset Turn Over (ATO)	*-tive/ Not Sig*	*+tive/ Not Sig*	*-tive/ Not Sig*
Return on Asset (ROA)	*+tive/ Sig****	*+tive/ Sig****	*-tive/ Sig****
Return on Equity (ROE)	*+ive/ Sig****	*-tive/ Sig****	*-tive/ Sig****
Return on Investment (ROI)	*+tive/ Sig *****	*-tive/ Sig *****	*-tive/ Sig *****
Firm's EPS (EPS)	*+ive/ Not Sig*	*-tive/ Not Sig*	*-tive /Sig ** *
Enterprising Value (EVA)	*+tive/Not Sig*	*+tive/ Not Sig*	*-tive/ Not Sig*
Price to Book Value (MB)	*+tive/ Sig *****	*-tive/Not Sig*	*-tive/ Not Sig*

Table 11 Summary of the Random OLS estimation Result of Model

+tive = Positive; -tive = negative; sig = significant; not sig = not significant. Asterisk (*) indicates significance. *** Indicates 1% significance level. ** Indicates 5%significance level while * Indicates

10%significance level.

Table 12 Estimation Result of Model

Model	Hypothesis	Expected sign	Obtained sign	Valid/reject
MODEL	*H1*	*+tive/ Sig ****	*-tive/ Not Sig*	*REJECT*
	H2	*+tive/ Sig ****	*+tive/ Sig****	*VALID*
	H3	*+tive/ Sig ****	*+ive/ Sig****	*VALID*
	H4	*+tive/ Sig ****	*+tive/ Sig ****	*VALID*
	H5	*+tive/ Sig ****	*+ive/ Not Sig*	*REJECT*
	H6	*+tive/ Sig ****	*+tive/Not Sig*	*REJECT*
	H7	*+tive/ Sig ****	*+tive/ Sig ****	*VALID*

The direction and remarks for each variable is shown in the table above. Positive/ significance means that as the variable increase, the dependent variable increases while negative/significance means as the independent variable increase, the dependent variable decreases. Similarly, Positive/ not significance and negative/not significance means such independent variables do not explain the dependent variable.

FINDINGS

The automobile industry is experiencing dynamic and competitive challenges. This knowledge intensive industry represented by Intellectual capital is a critical resource of the sector in the value creation process. Some of the findings of the study indicate and support the direction and pattern of the study.

- One of the objective of the study was to identify the factors influencing intellectual capital measurement practices and the systematic review of literature survey has identified the factors based on 3 categories such as general, management and conceptual. In the general factors the major variable identified were the size of the firm and the financial leverage of the firm. In terms of factors related to management it was majorly focused on culture, climate and attitude towards the firms innovative practices. The study identified the factors which was related to the conceptual framework and focus of the study was the structure, the capital employed and the human resource deployed in any organization.
- Related to the second major objective of the study was to investigate the impact of value-added intellectual capital on the financial performance. The model

used were based on the method of analysis used and introduced by Pulic (1998, 2001) to measure intellectual capital efficiency. panel data analysis was used to see the influence of VAIC on financial performance over a period of 10 years. The value of the Indian automobile companies is established by its human capital value, structural capital value and capital employed value. Model which used multiple regression and the overall results indicate that intellectual capital has positive and strategically significant influence on the financial performance of the companies which are represented by ratios such as Return on Assets, Return on Equity, Return on Investment and Price to Book Value.

- The index value showing the intellectual capital of the firms representing automobile sector is positive indicating that this capital plays a major role in the firms. Firms like Amara, Bajaj and Bharat shows higher value index of 6.61600, 7.3100 and 6.5000 respectively, whereas firms such as Exide, Tata Motors, Eicher Motors and Maruthi shows an above average index values of 4.9200, 4.6300, 4.3600 and 4.2200 respectively and the index values of companies like Mahindra & Mahindra, Ashok Leyland, Apollo Tyres, Bosch, TVS and MRF shows an average index value of 3.0300, 3.4300, 3.2200, 36600, 3.2900 and 3.7600 respectively.
- Variables such as EPS, EVA and Asset Turnover does not show an influence. Intellectual capital is recognized as a major factor capable of generating market value and as a result attract more investment to the sector. This investigation shows that firms can formulate its business strategies to increase their efficiency of resources and achieve competitive advantage by factoring in intellectual capital indicators.
- Automobile companies survive and prosper by their core strategies. The companies should realize that the intellectual capital indicator would influence and impact their Return on Investment. The companies should realize that their major business discriminator is intellectual capital. Gone are the days where investment in technology influences return, it is an era where the challenge is to recruit the best and maintain the advantage over time, enhance the systems, structure in place and enhance returns. Companies that transfer knowledge and enhance the knowledge and encourage innovation throughout the company in order to maximize their effectiveness will be more successful.

- The Return on Equity ratio which measures the return expected by shareholders of the automobile companies. This ratio is very significant as it indicates how the management of a company works in generating profits out of the investment received from them. Investors are keen to invest in automobile companies that have a higher ROE. This could be enhanced if the firms focus on their profits. Profits are earned by identifying the core intellectual capital components and strategizing to improve it.
- The Return on Assets ratio indicates the profitability of the automobile companies in relation to the total invested assets. It gives the investors, analyst and managers an understanding of the efficient use of the invested assets which in turn generates revenue. This could be achieved through the intellectual capital components.
- The study also through its extensive literature corroborated the major factors that has to be identified by firms to be included in its intellectual capital disclosure framework and the major findings are listed below.

Table 13 Intellectual capital Framework

Internal	**External**	**Knowledge**
Value added relations	Contracts	Spirit and culture
Systems and networks	Franchise & agreements	Competencies
Managerial information systems	Licenses	Skill
Process and procedures	Collaborations	Training
Culture	Channels	Qualification
Philosophy	Customer loyalty	Know-how
Copyrights/trademarks/patents		

Source: from research findings

Figure 5. IC Framework

- Over many years there is an increasing concept that a firm's competitive difference among its counterparts is because e of the existence of a gap between market and book value which is expressed by various researchers in many ways and this gap is widely believed to be the intellectual capital components of a firm. The firms representing the automobile sector who has initiated the effort towards managing its intellectual capital and disclosing are successful. The price to book value ratio is an indicator of the gap.

- Asset Turnover ratio indicates the efficiency level of a company in resource management to generate sales. Higher the ratio better the company's internal state of affairs. It is basically about the management of the company. If the ratio is low it signals excessive production and very poor inventory management and unhealthy collection practice. Several researches have taken ATO as a key financial performance indicator, however the results of the study do not show a positive influence indicating that intellectual capital components except HCE does not play as a major influencing factor to improve the turnover ratio.
- In the automobile sector or any other sector, the growth in its earning per share is an important financial indicator to showcase the amount the company could directly make for its stakeholders. Intellectual capital components do not directly influence EPS ratio as it is based on the earnings and the number of shareholders of the company. Preliminary importance is to increase profits and so the results showing no influence could be moderately accepted as the reason for EPS growth could be either profits or managing the number of shareholders.
- A major part of analysis to estimate the economic profit of a company is through a value-added measure which is called as the EVA, which is an indicator of the amount of value created in excess of the required return of a company's shareholders. The ratio gives a value which is positive when the return of a company representing the automobile sector's economic profit exceeds its cost of capital. The study indicates that there is no significance indicating that calculation of economic profits is a complex procedure and it does not show the direct calculated profit.
- The above results clearly indicate that there is a positive and statically significant influence of intellectual capital on financial performance on ROA, ROE, ROI and Price/Book value as these ratios are direct indicators of return and financial performance of a company. The results of EPS, EVA and ATO shows no significance and as these ratios are not direct financial performance indicators. The system needs new measures for performance a new measure for valuation. The firms in the automobile sector should formulate a strategy to adopt intellectual capital measures through identifying and evaluating the significant role of intellectual capital and knowledge management in the company.

- Each firm should design its format for reporting its intellectual capital and the study strongly supports firms to adopt the VAIC model into order to disclose intellectual capital for a meaningful comparison of the company within the automobile industry and also with itself over a period of time.

DISCUSSION ON THE FINDINGS

The study indicates Return on Equity ratio which measures the return expected by shareholders of the automobile companies. This ratio is very significant as it indicates how the management of a company works in generating profits out of the investment received from them. Investors are keen to invest in automobile companies that have a higher ROE. The findings of the study is in line with the previous studies conducted through a static panel fixed-effect model is used to analyse the data. The empirical results suggest that SCE and CEE has a positive significant relationship on ROA and ROE(Shamsudin & Yian, 2013). Most of the studies similar to the research indicate that intellectual capital has no significant effect on the Asset Turnover . This study contradicts the findings highlighted in the contribution of IC in making the manufacturing firm strong and to face long term competition(Alhassan & Asare, 2016). But the results of the study is also in inline with a study related to intellectual capital and productivity. In addition, according to (Chu, Chan, & Wu, 2011), ATO has no impact by intellectual capital since it is more affected by capital employed not human capital or structural capital. Moreover, the impact of capital employed is small towards intellectual capital. As a result, there is no significant

Earnings per share results shows that there is no significant relationship between intellectual capital and EPS whereas the financial leverage and size indicates a positive and significant relationship. This concurs with most of the studies and is supported by previous study from(Latif, et al. 2012) and (Rehman, et al. 2011) . Moreover the Market-to-book Ratio (M/B Ratio) has the highest significance level. This condition has ever been tested in previous study that hidden value of M/B Ratio contributed 40.96% towards market value of 96 companies listed in Athens Stock Exchange (Maditinos, Chatzoudes, Tsairidis, & Theriou, 2011). The existence of M/B Ratio has underlied the increasing gap between book value and market value for years (Wang, 2008). The findings indicate to a positive significant relationship between intellectual capital and financial performance of companies and the positive effect of the size of company on availability rate of intellectual capital and financial performance of a company(Pilková et al., 2013) Considering these findings it can be recommended

to managers, shareholders, investors and other stakeholders to focus their attention on the Internal resources and capabilities of an organization and making use of this model for obtaining a higher financial return and achieving the actual value of companies(Afshari et al., 2014). The manifestation of the intangible value of companies has an increasing role in the performance of a company (Nazari, 2010). The study identifies the existing problem of the underplayed role of intellectual capital through the following. Attention has to be given to this capital as it helps

- In identifying the gap between market value and book value of a firm.
- In embedding the elements of human capital, structural capital and capital employed in the strategic decision making process the firm Provides information to the stakeholders in terms of the value of the firm
- Helps in measuring and identifying the value additivity of corporates.

Thus, the growing interest in the concept and management of intellectual capital is because of the intangibles that exist in knowledge processes and products. The automobile industry and the firms under the umbrella should create, shape and update their intellectual capital assets and mix all the dimensions in the context of an organization through investigation and utilization, quantification and divulgence. The conceptualization of the knowledge is through a multi stage process which is monitored by a transformative logic. Therefore, it is a cycle adopted by firms and this cycle has many inter-related stimulants such as imperative alignment, investigation and utilization and finally measurement and reporting.

SUGGESTIONS

Complementing the traditional statements which report the financials of company exist and co-exist the concept of intellectual capital, there is a continuous growing need in reporting these intangibles by means of intellectual reports. This concept is considered to be the main driver of any business since when we consider the economy as a knowledge economy the only currency that stays is knowledge itself. The traditional thought of capital no longer exists, today capital has several elaboration and category. The category ranges from capital invested in the human resources to the investment made in structure of the organization and also a very separate category that relates to the amount of physical capital that is deployed. Some of the research has seen intellectual capital separately from the financials and the reports are more subjective. One cannot deny the fact that the core existence of any business is based on the financial and accounting reports and the developed model presents the same in a better fashion

capturing all the subjective factors which could not be viewed at a glance. Thus, the index generated as intellectual capital index which adds up the true value could be used in the annual reports and recorded and remain as one of the disclosure requirements which could be made mandatory. It is thereby important for firms to consider the intangibles as an element in their functioning. The analysis shown above indicates the impact of this capital on the performance related to financial performance reporting and it has proved that it does have an impact and it is essential that all the firms consider in employing the intellectual capital components effectively and efficiently in the organization in order to ensure that it leads to high growth and productivity.

It is indeed very difficult to gauge the future of the automotive industry in India and we need to be prepared on the basis of informed predictors in order to face the uncertainties ahead and learn to thrive through chaos and ambiguity. The success and future of this industry is not in the quantum of resource but rather in the quality of their intangibles it is imperative for the sector and its leaders to create indicators of intellectual capital and constantly push themselves ahead and evolve. They need to act with agility on this journey as they need to solve issues posed by disruptive forces and diverse opportunist. A balanced approach and intervention with clarity to incorporate intellectual capital would help to build solutions for long term sustainability. The automobile industry would succeed and survive the test of times if it is moving towards agility, empowerment of workforce and diversification. Identification of intangibles through structured investment in intellectual capital elements would help the industry to identify new distribution networks and markets, help in pursuing the most appropriate strategy, focus on competitive intelligence about product offering, areas of expertise, nature of business etc., Further development and spend in R&D, customer assessment, social media analysis, text analytics, web analytics, Automotive analytics etc., this industry is more data-dependent and innovation is the key to growth as investment in technology and focus on automotive analytics based solutions to help the firms to understand product use and consumer preference and making manufacturing process efficient.

RECOMMENDATION FOR FURTHER RESEARCH

The study has concluded with a positive note there are some recommendations which could be carried over for further research. The study could not be generalized as to an extent this could be only limited to the auto sector and essentially is should be necessary to do another research a cross - industry study. The sector under study

generally operates with different regulatory requirement and the enforcing environment and the results may be firm specific. Future research could embark on a relative survey in order to identify and investigate and to confirm the causality and interrelationships that exist among the factors affecting intellectual capital and with specific reference to the influencing factors related to the latest online and social media business factors. The several models analyzed during the course of the study identified VAIC as the best model and there may be several other evolving models which could be used for further study.

Implications of the study.

- The index value showing the intellectual capital of the firms representing automobile sector is positive.
- It indicates that the firms in the automobile sectors proves to have technical expertise and process knowledge.
- The IC value gives the firm a significant competitive advantage, it is entirely possible that a large portion of the firm's valuation is derived from this expertise and knowledge
- The companies should realize that the intellectual capital indicator would influence and impact their financial performance.
- The companies should realize that their major business discriminator is intellectual capital.
- Gone are the days where investment in technology influences return, it is an era where the challenge is to recruit the best and maintain the advantage over time, enhance the systems, structure in place and enhance returns.
- Companies that transfer knowledge and enhance the knowledge and encourage innovation throughout the company in order to maximize their effectiveness will be more successful.
- The ratios are direct indicators of return and financial performance of a company. The results are consistent with the previous researches conducted by Ghosh and Mondal (2009), Muhammad and Ismail (2009), Ting and Lean (2009) and Ståhle, Ståhle&Aho (2011).
- The system needs new measures for performance and a new measure for valuation. The firms in the automobile sector should formulate a strategy to adopt intellectual capital measures through identifying and evaluating the

significant role of intellectual capital and knowledge management in the company.

- Investors use the asset turnover ratio to compare similar companies in the same sector or group.
- It is a tool to see which firms are making the most use of their assets and to identify weaknesses in firms.
- Most of the studies similar to the research indicate that intellectual capital has no significant effect on the asset turnover.
- This study contradicts the findings highlighted in the contribution of IC in making the manufacturing firm strong and to face long term competition(alhassan & asare, 2016). But the results of the study is also in in line with a study related to intellectual capital and productivity.
- In addition, according to (chu, chan, & wu, 2011), ATO has no impact by intellectual capital since it is more affected by capital employed not human capital or structural capital. Moreover, the impact of capital employed is small towards intellectual capital. As a result, there is no significance.
- This concurs with most of the studies and is supported by previous study from(Latif, et al. 2012) and (Rehman, et al. 2011)
- EPS is a measure of: profitability and valuation .
- The results of the study indicate that Intellectual capital components do not directly influence EPS ratio as it is based on the earnings and the number of shareholders of the company.
- Preliminary importance is to increase profits and so the results showing no influence could be moderately accepted as the reason for EPS growth could be either profits or managing the number of shareholders.
- It indicates how the management of a company works in generating profits out of the investment received from them.
- Investors are keen to invest in automobile companies that have a higher ROE. This could be enhanced if the firms focus on their profits.
- Profits are earned by identifying the core intellectual capital components and strategizing to improve it.
- The findings of the study is in line with the previous studies conducted through a static panel fixed-effect model is used to analyse the data.

- The empirical results suggest that SCE and CEE has a positive significant relationship on ROA and ROE(Shamsudin & Yian, 2013) & (Gruian, 2011)
- It gives the investors, analyst and managers an understanding of the efficient use of the invested assets which in turn generates revenue. This could be achieved through the intellectual capital components.
- The findings of the study is in line with the previous studies conducted by (Mehri, Umar, Saeidi, Hekmat, & Naslmosavi, 2013) (Mondal, 2016b)
- The findings indicate to a positive significant relationship between intellectual capital and Market to book value of companies and it is in line with the positive effect of the size of company on availability rate of intellectual capital and financial performance of a company(Pilková, Volná, Papula, & Holienka, 2013).
- The existence of M/B Ratio has underlined the increasing gap between book value and market value for years (Wang, 2008).
- Considering these findings it can be recommended to managers, shareholders, investors and other stakeholders to focus their attention on the Internal resources and capabilities of an organization and making use of this model for obtaining a higher financial return and achieving the actual value of companies(Afshari et al., 2014). The manifestation of the intangible value of companies has an increasing role in the performance of a company (Nazari, 2010).

The study is restricted to the Indian automobile companies, it might be extended to other countries well. However, the potential legislative limitations and the regulation of each country has to as be considered. The researcher could also use other contextual variables such as social media influence, online marketing, analytics and reporting, digital marketing, corporate governance etc., the current study could not include more variable as there were unavailability of data availability and also limitation of time.

CONCLUSION

Everything that an organization has when its employees resign and the intangible value of its human resource along with its relationships is commonly called as intellectual capital. In simple words that something which gives the firm an edge over the others. It is also known as how best a firm could put best use of its available knowledge through knowledge measurement and management systems which is otherwise called as intellectual capital. A firm needs a strategic vison to blend all the

elements representing intellectual capital. It needs to explore, exploit, measure and finally disclose its intellectual capital value. This disclosure will help the stakeholders to assess the wealth created by the firm in terms of value and thereby optimize or increase its stock price.

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APPENDIX

ANNEXURE 1

ROA

POOLED RERESSION

Dependent Variable: ROA
Method: Panel Least Squares
Date: 08/21/19 Time: 17:21
Sample: 2009 2018
Periods included: 10
Cross-sections included: 15
Total panel (balanced) observations: 150

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.04072	2.902980	3.803237	0.0002
VAIC	5.857792	1.143498	5.122696	0.0000

SIZE	-38.87515	12.17196	-3.193829	0.0017
LEV	-1.129789	0.220260	-5.129353	0.0000

R-squared	0.517753	Mean dependent var	10.30647
Adjusted R-squared	0.507844	S.D. dependent var	7.690800
S.E. of regression	5.395391	Akaike info criterion	6.235272
Sum squared resid	4250.095	Schwarz criterion	6.315555
Log likelihood	-463.6454	Hannan-Quinn criter.	6.267888
F-statistic	52.24984	Durbin-Watson stat	0.503130
Prob(F-statistic)	0.000000		

FIXED REGRSSION

Dependent Variable: ROA
Method: Panel Least Squares
Date: 08/21/19 Time: 17:21
Sample: 2009 2018
Periods included: 10
Cross-sections included: 15
Total panel (balanced) observations: 150

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.39547	2.969234	3.837850	0.0002
VAIC	6.094552	1.191543	5.114839	0.0000
SIZE	-41.36732	12.65978	-3.267619	0.0014
LEV	-1.087053	0.228013	-4.767502	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.536289	Mean dependent var	10.30647
Adjusted R-squared	0.495672	S.D. dependent var	7.690800
S.E. of regression	5.461702	Akaike info criterion	6.316077
Sum squared resid	4086.736	Schwarz criterion	6.576999
Log likelihood	-460.7058	Hannan-Quinn criter.	6.422081
F-statistic	13.20356	Durbin-Watson stat	0.440487
Prob(F-statistic)	0.000000		

RANDON REGRESSION Dependent Variable: ROA
Method: Panel EGLS (Period random effects)
Date: 08/21/19 Time: 17:22
Sample: 2009 2018
Periods included: 10
Cross-sections included: 15
Total panel (balanced) observations: 150
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.04072	2.938659	3.757062	0.0002
VAIC	5.857792	1.157552	5.060501	0.0000
SIZE	-38.87515	12.32155	-3.155052	0.0019
LEV	-1.129789	0.222967	-5.067077	0.0000

Effects Specification		
	S.D.	Rho
Period random	0.000000	0.0000
Idiosyncratic random	5.461702	1.0000

Weighted Statistics			
R-squared	0.517753	Mean dependent var	10.30647
Adjusted R-squared	0.507844	S.D. dependent var	7.690800
S.E. of regression	5.395391	Sum squared resid	4250.095
F-statistic	52.24984	Durbin-Watson stat	0.503130
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.517753	Mean dependent var	10.30647
Sum squared resid	4250.095	Durbin-Watson stat	0.503130

HAUSMAN LM

Correlated Random Effects - Hausman Test
Equation: Untitled
Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	0.840138	3	0.8398

** WARNING: estimated period random effects variance is zero.

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
VAIC	6.094552	5.857792	0.079849	0.4021
SIZE	41.367324	-38.875147	8.449289	0.3912
LEV	-1.087053	-1.129789	0.002276	0.3704

ANNEXURE 2

Patent filings by Indian Automobile industry – Sample Extract from Data analysis

From last five years Indian Automotive Industries have filed many patent applications and using the same technologies in their product line to overwhelm the market competitions.

Report 2014 – 2018

Ashok Leyland Ltd	11
Bajaj Auto	45
Exide Industries	3
Honda Motor	0
Maruti	2
Mahindra & Mahindra	51
Motherson Sumi	1
Tata Motors	159
TVS Motors	69

Indian Auto Industry is now pacing up with the impact of Intellectual Property [IP] in their business field. But, they are still way behind in comparison to US and European Auto Industry. Growing with IP should be new mantra for Indian Auto Industry.

Patent filings by Indian Auto companies:

SECTOR	FOREIGN FILINGS	INDIAN FILINGS
Pistons	33	10
Engine Value	34	5
Carburetors	1500	2
Fuel Delivery System	20	13
Spark Plugs	2000	3
Gears	344	39
Wheels	1000	400
Steering	1068	155
Axle	162	50
Clutch	480	222
Starter Motor	600	6
Leaf Spring	10	6
Brake	922	318
Shock absorber	94	34
Brake Lining	12	6
Body	975	16
Wheel Aligner	13	0
Wheel balancers	9	0
Tyre	112	179
Rim	55	2
Seat Belt	117	15
Seat	1404	60
Safety Device	192	35
Door Lock	256	45
Oil Pan	7	1
Filter	145	25
Cooling fan	17	5
Window glass	91	3
Wiper	460	18

The IP should be incorporated in an industry with a long term vision. Identifying, recording and registering of own IP should be in company agenda. Indian Auto industry has to realize that an intellectual property right is the essence of present knowledge economy and would be able to hold the industry against strong competitive market force. That would ultimately lead to a new future for Indian business and would participate in making the economy stronger by enriching it with new technologies.

Evaluation of companies under Nifty Auto

Ashok Leyland

"Ashok Leyland, flagship of the Hinduja group, is the 2nd largest manufacturer of commercial vehicles in India, the 4th largest manufacturer of buses in the world, and the 10th largest manufacturers of trucks. Headquartered in Chennai, 9 manufacturing plants gives an international footprint - 7 in India, a bus manufacturing facility in Ras Al Khaimah (UAE), one at Leeds, United Kingdom and a joint venture with the Alteams Group for the manufacture of high-press die-casting extruded aluminium components for the automotive and telecommunications sectors, Ashok Leyland has a well-diversified portfolio across the automobile industry. Ashok Leyland has recently been ranked as 38th best brand in India."

Calculation of Intellectual capital of Ashok Leyland – VAIC MODEL

Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:

VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.

INR in Million

Year	2018
operating profit	41351.000
Employee cost Allowances paid Exgratia/Bonus Remuneration to Directors Seperation cost due to voluntary retirement Retrenchment cost Termination cost Provident fund Induction Cost Training Cost Gratuity Staff Welfare Expenses Incentives	1502.444
Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights Software Licence (Intangible assets are amortized using the straight line amortization method.	6459.000

Goodwill is an intangible asset that is not amortized, but is instead tested for impairment on an annual basis. The economic or useful life of an intangible asset is based on an estimate made by management and is subject to change under certain market conditions.)	
Value Added	49312.000

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	318031.000
Total assets	
Less: Intangibles	
Less: Goodwill	
Value added capital employed efficiency=va/ca	0.1551

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	1502.000
Value added human capital efficiency = va/hc	32.8215

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	
Value Added – Human Capital	47810.000
Value added structural capital efficiency = sc/va	0.9695

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	33.9461

Tata Motors

Tata Motors Group (Tata Motors) is a $45 billion organisation. It is a leading global automobile manufacturing company. Its diverse portfolio includes an extensive range of cars, sports utility vehicles, trucks, buses and defence vehicles. Tata Motors is one of India's largest OEMs offering an extensive range of integrated, smart and e-mobility solutions

Calculation of Intellectual capital of Tata Motors – VAIC MODEL
Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:
VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.
INR in Million

Year	2018
operating profit	29521.0000
Employee cost Allowances paid Exgratia/Bonus Remuneration to Directors Seperation cost due to voluntary retirement Retrenchment cost Termination cost Provident fund Induction Cost Training Cost Gratuity Staff Welfare Expenses Incentives	28344.7343
Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights Software Licence	267684
Value Added	908590

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	
Total assets	
Less: Intangibles	
Less: Goodwill	

Value added capital employed efficiency=va/ca	.2946

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	28345
Value added human capital efficiency = va/hc	9.4439

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	
Value Added – Human Capital	239339
Value added structural capital efficiency = sc/va	0.8941

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	10.6326

Exide

For more than six decades, Exide has been one of India's most reliable brands, enjoying unrivalled reputation and recall. Their constant emphasis on innovation, extensive geographic footprint, strong relationship with marquee clients and steady technology upgradations with global business partners have made Exide a distinct frontrunner in the lead-acid storage batteries space for both automotive and industrial applications.

Calculation of Intellectual capital of Exide– VAIC MODEL
Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:
VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.
INR in Million

Year	2018
operating profit	11326
Employee cost Allowances paid Ex-gratia/Bonus Remuneration to Directors	597

Separation cost due to voluntary retirement Retrenchment cost Termination cost Provident fund Induction Cost Training Cost Gratuity Staff Welfare Expenses Incentives	
Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights Software Licence	2672
Value Added	14595

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	192020
Total assets	
Less: Intangibles	
Less: Goodwill	
Value added capital employed efficiency=va/ca	.0760

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	597
Value added human capital efficiency = va/hc	24.4437

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	
Value Added – Human Capital	13998
Value added structural capital efficiency = sc/va	.9591

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	25.4788

Eicher Motors

Incorporated in 1982, Eicher Motors Limited is the flagship company of the Eicher Group in India and a leading player of the Indian automobile industry.

Calculation of Intellectual capital of Eicher Motors - VAIC MODEL
Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:
VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.
INR in Million

Year	2018
operating profit	2174.0000
Employee cost Allowances paid Ex-gratia/Bonus Remuneration to Directors Separation cost due to voluntary retirement Retrenchment cost Termination cost Provident fund Induction Cost Training Cost Gratuity Staff Welfare Expenses Incentives	426.1998
Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights Software License	2233.0000
Value Added	
	4833

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	92922
Total assets	
Less: Intangibles	
Less: Goodwill	

Value added capital employed efficiency=va/ca	0.0520

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	426
Value added human capital efficiency = va/hc	11.3402

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	
Value Added – Human Capital	4407
Value added structural capital efficiency = sc/va	.9118

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	12.3041

Amara Raja Batteries

Amara Raja Batteries Limited, India's largest automotive batteries manufacturer, supplies automotive batteries to Aftermarket, top Original Equipment Manufacturers (OEM), Private Labeling and Exports to over 32 countries globally.

Calculation of Intellectual capital of Amara Raja Batteries - VAIC MODEL Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:

VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.

INR in Million

Year	2018
operating profit	883
Employee cost Allowances paid Ex-gratia/Bonus Remuneration to Directors Separation cost due to voluntary retirement Retrenchment cost Termination cost Provident fund Induction Cost Training Cost	309.0090

Gratuity Staff Welfare Expenses Incentives	
Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights Software License	2303.000
Value Added	3495

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	41635
Total assets	
Less: Intangibles	
Less: Goodwill	
Value added capital employed efficiency=va/ca	0.0839

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	309
Value added human capital efficiency = va/hc	11.3104

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	3186
Value Added – Human Capital	
Value added structural capital efficiency = sc/va	.9116

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	12.3059

Apollo Tyres

Apollo Tyres Ltd. came into inception in 1972 and has since been a trusted name in the business of manufacture and sale of tyres. With its corporate headquarters in Gurgaon, India. Apollo Tyres has multiple manufacturing units in India, the Netherlands and Hungary.

Calculation of Intellectual capital of Apollo Tyres - VAIC MODEL
Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:
VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.
INR in Million

Year	2018
operating profit	1666.000
Employee cost Allowances paid Ex-gratia/Bonus Remuneration to Directors Separation cost due to voluntary retirement Retrenchment cost Termination cost Provident fund Induction Cost Training Cost Gratuity Staff Welfare Expenses Incentives	2156.3973
Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights Software License	5926.000
Value Added	9748

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	192447
Total assets	
Less: Intangibles	
Less: Goodwill	
Value added capital employed efficiency=va/ca	0.0507

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	2156

Value added human capital efficiency = va/hc	4.5207

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	7592
Value Added – Human Capital	
Value added structural capital efficiency = sc/va	..7788

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	5.3501

Bajaj Auto

Bajaj Auto Limited is an Indian global two-wheeler company and three-wheeler manufacturing company based in Pune, Maharashtra. It manufactures motorcycles, scooters and auto rickshaws. Bajaj Auto is a part of the Bajaj Group. It was founded by Jamnalal Bajaj in Rajasthan in the 1940s.

Calculation of Intellectual capital of Bajaj Auto- VAIC MODEL
Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:
VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.
INR in Million

Year	2018
operating profit	4779.0000
Employee cost	
Allowances paid	
Ex-gratia/Bonus	
Remuneration to Directors	
Separation cost due to voluntary retirement	
Retrenchment cost	
Termination cost	
Provident fund	
Induction Cost	
Training Cost	
Gratuity	
Staff Welfare Expenses	
Incentives	1069.5125

Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights Software License	3148.0000
Value Added	8997

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	250957
Total assets	
Less: Intangibles	
Less: Goodwill	
Value added capital employed efficiency=va/ca	0.0358

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	1070
Value added human capital efficiency = va/hc	8.4118

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	7927
Value Added – Human Capital	
Value added structural capital efficiency = sc/va	.8811

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	9.3287

Bosch

Bosch Ltd is an India-based auto component manufacturer company. The company has their presence in three business sectors, such as Automotive Technology, Industrial Technology and Consumer Goods and Building Technology. They manufacture and trade products as diverse as diesel and gasoline fuel injection systems, automotive aftermarket products, auto electricals, special purpose machines, packaging machines, electric power tools and security systems.

Calculation of Intellectual capital of Bosch- VAIC MODEL

Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:
VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.
INR in Million

Year	2018
operating profit	2090.0000
Employee cost Allowances paid Ex-gratia/Bonus Remuneration to Directors Separation cost due to voluntary retirement Retrenchment cost Termination cost Provident fund Induction Cost Training Cost Gratuity Staff Welfare Expenses Incentives	1356.0400
Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights A company's brand	3148.0000
Value Added	6594.0000

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	139187
Total assets	
Less: Intangibles	
Less: Goodwill	
Value added capital employed efficiency=va/ca	0.0474

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	1356

Value added human capital efficiency = va/hc	4.8627

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	5238
Value Added – Human Capital	
Value added structural capital efficiency = sc/va	.7944

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	5.7044

Mahindra & Mahindra

Mahindra & Mahindra Limited is an Indian multinational car manufacturing corporation headquartered in Mumbai, Maharashtra, India. It was established in 1945 as Muhammad & Mahindra and later renamed as Mahindra and Mahindra.

Calculation of Intellectual capital of Mahindra & Mahindra - VAIC MODEL Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:

VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.

INR in Million

Year	2018
operating profit	13226.0000
Employee cost	
Allowances paid	
Ex-gratia/Bonus	
Remuneration to Directors	
Separation cost due to voluntary retirement	
Retrenchment cost	
Termination cost	
Provident fund	
Induction Cost	
Training Cost	
Gratuity	
Staff Welfare Expenses	
Incentives	10001.4084

Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights Software License	44.1900
Value Added	23272

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	46065.29
Total assets	
Less: Intangibles	
Less: Goodwill	
Value added capital employed efficiency=va/ca	0.5052

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	10001
Value added human capital efficiency = va/hc	2.3268

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	13270
Value Added – Human Capital	
Value added structural capital efficiency = sc/va	.5702

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	3.4023

Motherson Sumi

The company. was established in 1986 and is part of the Motherson Group. Motherson Sumi Systems Ltd. SSL including its subsidiaries and JVs is one of the leading manufacturer of automotive wiring harnesses, mirrors for passenger cars and a leading supplier of plastic components and modules to the automotive industry.

Calculation of Intellectual capital of Motherson Sumi - VAIC MODEL
Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses

(except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:
VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.
INR in Million

Year	2018
operating profit	5128.0000
Employee cost Allowances paid Ex-gratia/Bonus Remuneration to Directors Separation cost due to voluntary retirement Retrenchment cost Termination cost Provident fund Induction Cost Training Cost Gratuity Staff Welfare Expenses Incentives	11067.2038
Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights A company's brand	15752.0000
Value Added	31947

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	330532
Total assets	
Less: Intangibles	
Less: Goodwill	
Value added capital employed efficiency=va/ca	0.0967

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	11067
Value added human capital efficiency = va/hc	2.8867

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	20880
Value Added – Human Capital	
Value added structural capital efficiency = sc/va	.6536

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	3.637

TVS Motors

TVS Motor Company is a multinational motorcycle company headquartered at Chennai, India. It is the third largest motorcycle company in India with a revenue of over ₹20,000 crore in 2018-19. The company has an annual sales of 3 million units and an annual capacity of over 4 million vehicles

Calculation of Intellectual capital of TVS - VAIC MODEL
Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:
VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.
INR in Million

Year	2018
operating profit	1129.0000
Employee cost Allowances paid Ex-gratia/Bonus Remuneration to Directors Separation cost due to voluntary retirement Retrenchment cost Termination cost Provident fund Induction Cost Training Cost Gratuity Staff Welfare Expenses Incentives	868.4620
Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights A company's brand	3736.0000
Value Added	5733

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	129273
Total assets	
Less: Intangibles	
Less: Goodwill	
Value added capital employed efficiency=va/ca	0.0444

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	868
Value added human capital efficiency = va/hc	6.6019

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	4865
Value Added – Human Capital	
Value added structural capital efficiency = sc/va	0.8485

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	7.4948

Bharat Forge

Bharat Forge Limited is a Pune-based Indian multinational company involved in automotive, power, oil & gas, construction & mining, locomotive, marine and aerospace industries. The company has now entered into the defence sector and is moving from being a components manufacturer to a complete product make.

Calculation of Intellectual capital of TVS - VAIC MODEL
Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:

VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.

INR in Million

Year	2018
operating profit	1528.0000
Employee cost	
Allowances paid	
Ex-gratia/Bonus	
Remuneration to Directors	435.9120

Separation cost due to voluntary retirement Retrenchment cost Termination cost Provident fund Induction Cost Training Cost Gratuity Staff Welfare Expenses Incentives	
Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights A company's brand	4669.0000
Value Added	6633

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	99563
Total assets	
Less: Intangibles	
Less: Goodwill	
Value added capital employed efficiency=va/ca	0.0666

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	436
Value added human capital efficiency = va/hc	15.2162

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	6197
Value Added – Human Capital	
Value added structural capital efficiency = sc/va	0.9343

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	16.2171

MRF

MRF Limited is an Indian multinational and the largest manufacturer of tyres in India and the fourteenth largest manufacturer in the world. It is headquartered in Chennai, India. The company manufactures rubber products including tyres, treads, tubes and conveyor belts, paints and toys.

Calculation of Intellectual capital of - MRF - VAIC MODEL

Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:

VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.

INR in Million

Year	2018
operating profit	2414.0000
Employee cost Allowances paid Ex-gratia/Bonus Remuneration to Directors Separation cost due to voluntary retirement Retrenchment cost Termination cost Provident fund Induction Cost Training Cost Gratuity Staff Welfare Expenses Incentives	1074.5950
Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights A company's brand	7067.0000
Value Added	10556

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	164610
Total assets	
Less: Intangibles	
Less: Goodwill	
Value added capital employed efficiency=va/ca	0.0641

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the

period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	1075
Value added human capital efficiency = va/hc	9.8229

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	9481
Value Added – Human Capital	
Value added structural capital efficiency = sc/va	0.8982

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	10.7852

Hero Motocorp

Hero Motocorp Ltd., formerly Hero Honda, is an Indian motorcycle and scooter manufacturer based in New Delhi, India. The company is the largest two-wheeler manufacturer in the world, and also in India, where it has a market share of about 46% in the two-wheeler category.

Calculation of Intellectual capital of Hero Motocorp - VAIC MODEL
Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:
VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.
INR in Million

Year	2018
operating profit	5280.0000
Employee cost	
Allowances paid	
Ex-gratia/Bonus	
Remuneration to Directors	
Separation cost due to voluntary retirement	
Retrenchment cost	
Termination cost	
Provident fund	
Induction Cost	
Training Cost	
Gratuity	
Staff Welfare Expenses	
Incentives	1540.5940

Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights A company's brand	5750.000
Value Added	12571

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	170908
Total assets	
Less: Intangibles	
Less: Goodwill	
Value added capital employed efficiency=va/ca	0.0736

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	1541
Value added human capital efficiency = va/hc	8.1596

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	11030
Value Added – Human Capital	
Value added structural capital efficiency = sc/va	0.8774

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	9.1105

Maruti Suzuki

Maruti Suzuki India Limited, formerly known as Maruti Udyog Limited, is an automobile manufacturer in India. It is a 56.21% owned subsidiary of the Japanese car and motorcycle manufacturer Suzuki Motor Corporation.

Calculation of Intellectual capital of Maruti Suzuki - VAIC MODEL

Sample -2018

Calculation of Value Added (VA) VA = OUT – IN, where, OUT refers to total income from all products and services sold during period of t, and IN refers to all expenses

(except labor, taxation, interest, dividends, depreciation) incurred by firm for period of t. According to Pulic (2000), VA can also be calculated by using this equation:
VA = P + C + D + A = operating profit + employee cost + depreciation + amortization.
INR in Million

Year	2018
operating profit	1461.0000
Employee cost Allowances paid Ex-gratia/Bonus Remuneration to Directors Separation cost due to voluntary retirement Retrenchment cost Termination cost Provident fund Induction Cost Training Cost Gratuity Staff Welfare Expenses Incentives	2831.5865
Depreciation & Amortization Patents Trademarks Franchises or licensing agreements Goodwill Copyrights A company's brand	27598.0000
Value Added	31891

Calculation of Value Added Capital Employed Coefficient (VACA) VACA = VA / CA, where CA refers to Capital Employed, which equals to Total Tangible Assets at the end of t period, and VACA signifies the value created by one unit of capital.

Capital employed(CA)

Capital Employed	599367
Total assets	
Less: Intangibles	
Less: Goodwill	
Value added capital employed efficiency=va/ca	0.0532

Calculation of Value Added Human Capital Coefficient (VAHC) VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the company during the period of t, and VAHC denotes the value created by one unit of Human Capital invested during period of t.

Human Capital

Human Capital	2832
Value added human capital efficiency = va/hc	11.2624

Calculation of Value Added Structural Capital Coefficient (STVA) STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital.

Structural capital

Structural Capital	29059
Value Added – Human Capital	
Value added structural capital efficiency = sc/va	.9112

Calculation of Value Added Intellectual Coefficient (VAICTM) VAIC = VACA + VAHC + STVA, where VAIC indicates corporate value creation efficiency on firm resources

VAIC = VACA+VAHC+STVA	12.2268